Compensating Wages under Different Exchange Rate Regimes*

Mathias Hoffmann
Department of Economics
University of Cologne†

This Version December 21, 2004

Abstract

This paper analyses the interconnectedness between developing countries' domestic wage levels and their exchange rate choices. The theoretical model illustrates that differences in domestic wage levels are related to countries' exchange rate regimes. In particular, the level of domestic wages increases with the rigidity of the exchange rate regime. The empirical model explores the determinants of the domestic wage level in a cross-section of 38 developing countries. In line with the theoretical model, the economies under review experience a rise in the domestic wage level with an increase in the rigidity of their exchange rate regime.

JEL Classification: F330, F410

Keywords: Exchange Rate Regimes, Factor Prices, Monetary Policy, Uncertainty

---

*I would like to thank Lilia Cavallari, Michael Devereux, Dale Henderson, Robert Kollmann, Jaewoo Lee, Gian-Maria Milesi-Ferretti, Juergen von Hagen, Andreas Schabert, Carl Walsh, Axel A. Weber and participants of the Universita Degli Studi Roma Tre/CEPR Workshop 2003, ZEI Summer School 2003, University of Bonn, the seminar on International Economic Relations 2004, University of Göttingen, the Royal Economic Society Conference 2004 and the EEA/ESEM Meeting 2004 for helpful comments and suggestions. This work is part of a research network on 'The Analysis of International Capital Markets: Understanding Europe's Role in the Global Economy', funded by the European Commission under the Research Training Network Programme (Contract No. HPRN-CT-1999-00067).

†Address of Correspondence: Mathias Hoffmann, Department of Economics, University of Cologne -Chair of International Economics- Albertus-Magnus-Platz, 50931 Cologne, Germany. email: m.hoffmann@wiso.uni-koeln.de

1 Introduction

Differences in wage levels across countries are central to economic questions such as factor price equalisation, which affects the relative living standards or migration of labour across regions and countries. The general argument for factor price equalisation is based on the assumption of international trade. When countries trade the relative prices of goods converge. This convergence, it is argued, leads to the convergence of the relative prices of labour. Thus, there is a tendency towards the equalisation of factor prices. However, the question remains how far this tendency goes since in the real world factor prices are not equal and a wide range of wage rates across countries exists. While some of these wages differentials may be explained by differences in the quality of labour, the differentials are too wide to be explained on this basis alone.[1] The literature on factor price equalisation defines income levels as the key determinant for differences in factor prices across countries (see for example Balassa, 1964). An established fact in international economics is the empirical regularity that international wage levels across countries are positively related to the level of real income per capita (see Freeman and Oostendorp, 2002a, as well as Dornbusch, Fischer and Samuelson, 1977).

This paper offers a further explanation for differing wage levels across countries by relating the wage setting behaviour to the exchange rate choice. In particular, the implications of the exchange rate regime choice on wage setting behaviour is considered in developing countries. So far, the ability of exchange rate regimes to influence wage rates across developing countries has not been investigated in much detail. Yet, a wide range of exchange rate regimes exists in these countries. The choice to float or to peg the nominal exchange rate matters due to the presence of market distortions such as sticky prices or sticky wages.

The first authors making their case for flexible exchange rates are Friedman (1953) and Mundell (1961).[2] The authors argue that flexible exchange rates act as a 'shock absorber', which help to stabilise the economy when external shocks occur. In case of an external shock and sticky goods prices or sticky wages it is easier to adjust the nominal exchange rate than to wait until imbalances in the goods and labour market push the relative prices into the desired direction. Consequently, a floating exchange rate insulates the economy against external shocks. Additionally, a floating exchange rate allows a country's monetary policy to become independent of the nominal exchange rate. Thus, the country's monetary policy can be used to respond to real shocks which hit the economy.

[1] One of the most common explanations for this relationship is based on the differences in labour productivity across sectors and countries.

[2] Sachs (1980) was one of the first authors analysing the role of wage adjustments under flexible exchange rate regimes by concentrating on a dynamic Mundell-Fleming model.

Despite the importance of the exchange rate regime choice for developing countries, there is relatively little empirical work addressing their effects on domestic wage levels. Recent research has predominantly focused on exchange rates and their impact on labour markets. Branson and Love (1988) analyse exchange rate movements and manufacturing employment in the US. Their finding is that real US dollar appreciations are associated with a decline in employment in the durable goods sectors. Similarly, Gourinchas (1998) analyses exchange rate movements in relation to changes in employment for the US. His main finding is that US dollar depreciations lead to significant positive changes in gross employment. Goldberg and Tracy (2001) concentrate on the magnitude of wage sensitivity to movements in the US dollar. They establish that dollar fluctuations translate into more sensitive wages in the US. Little research has focused on exchange rate regimes and their impact on domestic wage levels.

This paper contributes to the existing literature by analysing the equilibrium effect of the exchange rate regime choice on domestic wage levels in developing countries. It is argued that the exchange rate regime choice matters since it influences the monetary authority's response to real shocks. Under floating exchange rates the monetary authority is able to accommodate real shocks. When the nominal exchange rate is inflexible, the monetary authority is unable to offset real disturbances. This creates uncertainty about the level of macroeconomic variables, such as consumption or labour supply. Consequently, households under fixed exchange rates require a wage premium relative to households under floating exchange rate regimes to compensate for the presence of uncertainty in the economy. This might especially be true in countries where only a limited amount of assets is available to insure against the consequences of real shocks. Especially developing countries have less developed capital and insurance markets. Thus, to offset uncertainty households in developing countries might use wages as a principal insurance mechanism. The latter argument builds on the work by Abowd and Ashenfelter (1981) who show that uninsured employment risk results in compensating wage differentials which are proportional to variations in labour supply by households.

The paper starts off by modelling the equilibrium effect of the exchange rate regime choice on the domestic wage level theoretically. In particular, a general equilibrium approach is utilised to analyse the optimal wage setting under different exchange rate regimes in a stochastic model with preset wages and imperfect competition. The domestic country is subject to productivity shocks and has the choice to either peg or float its nominal exchange rate. A comparison between the two exchange rate regimes shows that the monetary authority cannot resolve uncertainty about the level of macroeconomic variables under a pegging exchange rate regime.[3] This affects the

[3] This uncertainty argument was first established by Obstfeld and Rogoff (2000). A similar argument with respect to differing price levels across countries can be found in Broda (2003), Corsetti and Pesenti (2001) as well

expected utility of households. The more volatile the expected real shock the higher will be the expected utility costs. Households take those expected utility costs into account when deciding about their preset wages. As a consequence, households require a wage premium relative to households under floating exchange rate regimes.

To test the paper's hypothesis that the level of wages increases with the rigidity of the exchange rate regime empirically, newly constructed data sets by Freeman and Oostendorp (2002a,b) and Reinhart and Rogoff (2004) are utilised. The former authors transform the International Labour Organisation's (ILO) wage survey into a consistent data file on wage payment over the time period 1983 to 1998. Reinhart and Rogoff develop a new approach to reclassify historical exchange rate regimes over the period 1946 to 2001. Their de facto classification will be compared to the International Monetary Fund's (IMF) Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER, 2002), known as the de jure classification. The comparison between the two approaches allows an empirical assessment of the paper's hypothesis, using different exchange rate regime classifications. The empirical results document that the exchange rate regime variables play a significant role in explaining differences in the level of wages across developing countries. In particular, the empirical estimates show that the domestic wage level increases with the rigidity of the exchange rate regime and thereby supports the main theoretical result of the paper that a wage differential between fixed and floating exchange rate regimes exists.

The remainder of this paper is structured as follows: The theoretical model is delineated in the next section. Section 3 discusses the data used and presents the empirical strategy. The empirical estimates examine the determinants of the domestic wage level in a cross-section of developing economies, using the exchange rate regime variable in conjunction with a set of control variables which have been employed in the literature. Section 4 concludes by providing a brief summary of the findings.

2 The Model

This section develops a stochastic new open economy macroeconomics model.[4] It consists of a small open economy, Home (H), and the rest of the world, named Foreign (F). The model features optimising households, nominal rigidities and monopolistic competition. There is only

as Devereux and Engel (2000).

[4] See Corsetti and Pesenti (2001), Devereux (2002) as well as Obstfeld and Rogoff (2000). For a survey on the new open economy macroeconomics literature see Lane (2001).

one period and no ex-ante trade in state-contingent assets.[5] Agents set their wages before real shocks, production and consumption are realised. More precisely, households choose to set their preset wages equal to the expected marginal utility of consuming an additional unit of goods relative to their marginal costs of supplying work effort to the traded and nontraded goods sector. Productivity shocks are the only possible disturbance. Once uncertainty has been revealed households supply labour that firms demand and decide about money balances and consumption. Production in each country takes place out of traded and nontraded goods. The monetary policy is defined to be one with commitment. This is a reasonable assumption since the systematic component is more important than the surprise element in monetary policy (Lane, 2002). The monetary authority can observe the productivity shock, k, after wages are set and then sets the money supply in response.

Preferences, Consumption Indexes and Firms

There is a continuum of economic agents, indexed by $i \in [0,1]$. For each agent i the periodic utility function is given by

$$U(i) = \log C(i) + \log \frac{M(i)}{P} - k\frac{L(i)^{\nu}}{\nu}. \tag{1}$$

Households associate utility benefits with the consumption index $C(i)$, with holding real balances $\frac{M(i)}{P}$ and disutility with the obligation to supply labour effort, $L(i)$, to the traded and nontraded good firms. The elasticity of marginal disutility from work effort is given by $\nu - 1$, where $\nu > 1$. The assumption that $\nu > 1$ ensures that the labour supply schedule is downward sloping. In general, a rise in ν makes the labour supply more inelastic. A random shift in the marginal disutility of work effort, $k > 0$, can be seen as an inverse national productivity shock which affects productivity in the traded and nontraded sector equally.[6] A shock to productivity reflects the uncertainty in the model.

Total labour effort, $L(i)$, is given by labour effort in the home traded good sector, $L_H(i,z)$, and nontraded sector, $L_N(i,z)$, and equals $L(i) = \int_0^1 L_H(i,z)dz + \int_0^1 L_N(i,z)dz$. Each household acts as a monopolistic supplier of a variety of labour services, z, to the homogeneous traded and nontraded goods sector. The nominal wage in the two sectors is defined as $W(i)$. While wages are preset, prices of all goods are completely flexible and can be changed in response to market

[5] Lewis (1996) provides empirical evidence for this assumption. The main conclusions do not depend on the absence of dynamics.

[6] As in Obstfeld and Rogoff (2000), the variable $L(i)$ denotes efficient labour rather than the hours worked, $H(i)$. As a consequence, $H(i) = k^{\frac{1}{\nu}} L(i)$. Hence, technology is labour augmenting. A negative productivity shock, a rise in k, allows the household to produce less in a given amount of time.

conditions. Foreign agents, (F), have symmetric preferences and are denoted by $*$. Agent (i) faces the ex post budget constraint:

$$PC(i) + M(i) - M_0 = T + W(i)\left(L_H(i,z) + L_N(i,z)\right) + \Pi(i), \tag{2}$$

where $\Pi(i)$ denotes total profits and $T = M(i) - M_0$ are equilibrium per capita transfers in nominal terms. The household receives the profits, $\Pi(i)$, from the ownership of the firm. M_0 reflects the initial money holdings in the economy. Note that the trade balance condition equals $PC(i) = P_H C_H(i) + P_F C_F(i) + P_N C_N(i)$. For any household i the overall consumption index is given by $C(i) = C_T(i)^{\gamma} C_N(i)^{1-\gamma}$. The implication of the consumption index is that the intratemporal elasticity of substitution equals *unity*. The preference for the traded good C_T is represented by the parameter $0 < \gamma < 1$. C_T reflects the consumption of tradable goods, $C_T(i) = C_H(i)^{\eta} C_F(i)^{1-\eta}$. The relative preferences between the home produced good, $C_H(i)$, and foreign produced traded good, $C_F(i)$, are reflected by the parameter $0 < \eta < 1$. The nontraded consumption is characterised by $C_N(i)$. The consumption price index for household (i) is given by $P = \frac{P_T^{\gamma} P_N^{1-\gamma}}{\gamma^{\gamma}(1-\gamma)^{1-\gamma}}$. In turn, the traded goods price index equals $P_T = \frac{P_H^{\eta} P_F^{1-\eta}}{\eta^{\eta}(1-\eta)^{1-\eta}}$. The law of one price holds so that $P_H = SP_H^*$ and $P_F = SP_F^*$.

Maximising the objective function (1) subject to equation (2) and the trade balance condition yields the total demand functions:

$$C_T(i) = \gamma\left(\frac{P_T}{P}\right)^{-1} C(i) \text{ and } C_N(i) = (1-\gamma)\left(\frac{P_N}{P}\right)^{-1} C(i), \tag{3}$$

whereby $C_H(i) = \eta\left(\frac{P_H}{P_T}\right)^{-1} C_T(i)$ and $C_F(i) = (1-\eta)\left(\frac{P_F}{P_T}\right)^{-1} C_T(i)$ hold. The production technology of a fixed unit mass of firms in the traded, $Y_H(i) = L_H(i)$, and nontraded goods sector, $Y_N(i) = L_N(i)$, uses traded and nontraded labour input, $L_H(i) = \left(\int_0^1 L_H(i,z)^{\frac{\theta-1}{\theta}} dz\right)^{\frac{\theta}{\theta-1}}$ and $L_N(i) = \left(\int_0^1 L_N(i,z)^{\frac{\theta-1}{\theta}} dz\right)^{\frac{\theta}{\theta-1}}$. The foreign country has similar linear production technologies. Labour supply of households is differentiated and each household works for each firm in the two sectors. $L_H(i)$ and $L_N(i)$ are the aggregate of the individual labour supply in the two sectors. The elasticity of substitution between any two heterogeneous workers equals $\theta > 1$. The resource constraints for traded and nontraded goods produced in country H are $Y_H(i) = \int_0^1 C_H(i)di + \int_0^1 C_H^*(i)di$ and $Y_N(i) = \int_0^1 C_N(i)di$. Profits of the firms in the traded and nontraded sectors are defined by $\pi_H(z) = P_H Y_H(i) - \int_0^1 W(i) L_H(i,z)dz$ and $\pi_N(z) = P_N Y_N(i) - \int_0^1 W(i) L_N(i,z)dz$. The implicit labour demand schedule in the traded and nontraded good sector can be derived by differentiating the profit functions with respect to $L_H(i,z)$ and $L_N(i,z)$. Consequently,

$$W(i)=\left(\frac{L_H(i,z)}{L_H(i)}\right)^{-\frac{1}{\theta}}P_H \text{ and } W(i)=\left(\frac{L_N(i,z)}{L_N(i)}\right)^{-\frac{1}{\theta}}P_N \text{ holds.} \tag{4}$$

Optimisation and the Optimal Preset Wage

Given the profit income from the ownership of the firms as well as prices and preset wages, household (i) would like to divide income between consumption and money holdings. Maximising the utility function, equation (1), subject to the budget constraint outlined in equation (2), the first order conditions for consumption and nominal money balances are obtained: $\frac{1}{PC(i)}=\lambda$, and $\frac{1}{M(i)}=\lambda$. The ratio $\frac{1}{\lambda}$ measures the marginal utility of nominal wealth.

The optimal consumption is influenced by real money holdings. Since money only has a value for the current period, households equate marginal utility from holding money to the opportunity costs of acquiring it:

$$C(i)=\frac{M(i)}{P}. \tag{5}$$

Each household supplies labour to the traded and nontraded goods sector and faces downward sloping demand curves which are given by equation (4). Household (i) does not know the state of the economy. Therefore, it chooses its preset wage to maximise expected utility. The agents meet the demand they face at the preset wage once uncertainty is resolved. The optimal wage can be derived from the maximisation of equation (1) in terms of expected utility subject to equations (2) and (4).[7] The optimal wage in the two sectors will satisfy

$$W=\frac{\theta}{\theta-1}\frac{E_{-1}\left(kL^{\nu}\right)}{E_{-1}\left(\frac{L}{M}\right)}. \tag{6}$$

The right-hand side of equation (6) shows that households set their wages equal to the marginal costs of supplying an additional unit of labour relative to the marginal utility of consuming an additional unit of goods, $PC=M$, and the markup $\frac{\theta}{\theta-1}$. Marginal costs depend on the inverse productivity shock, k.

The expected utility gain from a small reduction in wage, $\left(E_{-1}\left(\frac{M}{L}\right)\right)^{-1}(\theta-1)$, has to equal the expected utility cost from higher work effort, $\frac{E_{-1}(kL^{\nu})}{W}\theta$. The cost of higher work effort increases in expected labour supply, $E_{-1}\left(L^{\nu}\right)$. Consequently, the incentive to reduce wages is smaller when expected labour supply is more volatile. A rise in productivity, a fall in k, reduces the marginal costs and stimulates output. It is worth noting that the results derived below would still be valid if only a share of households set their wages in advance while the remaining fraction of agents chose their wages to be completely flexible.

[7] Here the subscript (i) is ignored.

Equilibrium

The equilibrium for any monetary policy rule is represented by the goods market clearing in the home, $L_H = \eta\gamma(\frac{P}{P_H}C + \frac{SP^*}{P_H}C^*)$ and $L_N = (1-\gamma)\frac{P}{P_N}C$, as well as foreign country, $L_F^* = (1-\eta)\gamma(\frac{P}{SP_F^*}C + \frac{P^*}{P_F^*}C^*)$, utility maximisation by households and a balanced government budget.[8]

The closed form solution of the rational expectations equilibrium of the model for a given path of the money stock and a given foreign wage level, W^*, and money supply, M^*, equals

$C = \eta^\gamma\left(\left(\frac{\gamma M}{W}\right)^\eta\left(\frac{\gamma M^*}{W^*}\right)^{1-\eta}\right)^\gamma\left(\frac{(1-\gamma)M}{W}\right)^{1-\gamma}$	$W = \left(\frac{\theta}{\theta-1}\right)^{\frac{1}{\nu}}(E_{-1}(kM^\nu))^{\frac{1}{\nu}}$
$L = \frac{M}{W}$	$P_H = P_N = W$
$L_H = Y_H = \frac{\gamma M}{W}$	$P = \frac{W^{1+\gamma(\eta-1)}(SW^*)^{(1-\eta)\gamma}}{(\eta^\eta(1-\eta)^{1-\eta})^\gamma\gamma^\gamma(1-\gamma)^{1-\gamma}}$
$L_N = Y_N = \frac{(1-\gamma)M}{W}$	$S = \frac{1-\eta}{\eta}\frac{M}{M^*}$

The equilibrium nominal exchange rate, $S = \frac{1-\eta}{\eta}\frac{M}{M^*}$, has implications for the choice of the exchange rate regime: Although the preference parameter η is parametric, it is assumed temporarily that it could vary. A fall in η implies a depreciation of the nominal exchange rate. Under a peg the monetary authority has to respond procyclically to movements in the preference parameter η. Hence, a contractionary monetary policy is necessary to overcome the rise in the nominal exchange rate. The same is true for a decline in the rest of the world's money supply, M^*. No response is required to a productivity shock k.[9] Under floats the economy is independent of external shocks since the nominal exchange rate insulates the economy against movements in η and M^*. For the remaining part of the analysis η remains parametric. The foreign money stock $M^* = 1$ is taken as given and the same for country H, regardless of its choice to float or peg its nominal exchange rate. This assumption appears valid especially for small open economies under consideration.

The optimal wage in equilibrium, $W = \left(\frac{\theta}{\theta-1}\right)^{\frac{1}{\nu}}(E_{-1}(kM^\nu))^{\frac{1}{\nu}}$, depends on the distribution of the money stock in relation to productivity. Money supply, M, can be expressed as a log-linear transformation of k, and, therefore, a lognormal distribution of the two variables is assumed, where the mean value of $\log k = \kappa$, $E_{-1}(\kappa)$ equals zero, while the mean value of $\log M = m$, equals $E_{-1}(m) = \log M_0$.[10] Thus, the expected equilibrium wage equals

$$\log W = \frac{1}{\nu}\left(\Omega + \nu\log M_0 + \frac{\sigma_\kappa^2}{2} + \frac{\nu^2}{2}\sigma_m^2 + \nu\sigma_{\kappa,m}\right), \text{ where } \Omega = \log\left(\frac{\theta}{\theta-1}\right). \tag{7}$$

[8] Using equation (3) it can be shown that $P_H Y_H = \gamma PC = P_T\, C_T$. The same is true for the foreign country so that $(1-\eta)\,C_T = \eta C_T^*$. The consumption levels of traded goods are in constant proportion to each other.

[9] It is assumed that k and k^* are uncorrelated.

[10] The random vector $\underset{\sim}{X} = (X_1, ..., X_N)$ is normally distributed with a mean vector $\boldsymbol{\mu}$ and a variance-covariance matrix Σ. The function $G_{\underset{\sim}{X}}(\underset{\sim}{l})$ takes on a multinormal distribution: $G_{\underset{\sim}{X}}(\underset{\sim}{l}) = E(\exp(\underset{\sim}{l}\underset{\sim}{X}) = \exp(\underset{\sim}{l}\cdot\boldsymbol{\mu} + \frac{1}{2}\underset{\sim}{l}'\cdot\Sigma\cdot\underset{\sim}{l})$.

A rise in the volatility of the money supply, reflected by its variance $\sigma_m^2 > 0$, will increase the equilibrium nominal wage. This is due to the fact that households like to keep expected labour supply, $E_{-1}(L^\nu)$, constant. According to the equilibrium labour supply equation, $L = \frac{M}{W}$, labour increases linearly with the nominal money supply. Hence, households attach more weight to high values of money than to low ones. They set higher nominal preset wages, the more volatile money is. Furthermore, a negative covariance between productivity and money supply, $\sigma_{\kappa,m} < 0$, provides a hedge against the uncertain realisation of the productivity shock. Since real wages tend to be high when productivity is low, households set a lower nominal wage when the covariance is negative. A higher variance in the productivity shock k, $\sigma_\kappa^2 > 0$, increases the expected utility costs from work effort and, hence, wages in the economy.

Wage Differentials under different Exchange Rate Regimes

In order to assess whether the equilibrium level of wages depends on the exchange rate regime choice the monetary policy rules have to be defined.

Under a fixed exchange rate regime the monetary policy rule equals $M_{Peg} = M_0$, so that the money stock remains constant.

Given the equilibrium nominal exchange rate a constant money stock reflects the optimal response of the monetary authority under a fixed exchange rate regime to the productivity shock, k. Consequently, the monetary authority is not able to respond to any productivity shock since the variance of its money supply σ_m^2 equals zero. Moreover, money supply cannot be utilised as a hedge against the uncertain realisation of the productivity shock under fixed exchange rates because the covariance between the money stock and productivity $cov(\kappa, m) = \sigma_{\kappa,m}$ is non-existent under the applied monetary policy rule.

Under floating exchange rates the monetary policy is independent of the nominal exchange rate and the monetary authority can decide on an efficient monetary policy rule that accommodates the real shock in the economy. An efficient monetary policy rule, defined here as replicating the flexible wage equilibrium, reacts to changes in productivity procyclically so that $M'(k) < 0$ and $M''(k) > 0$.[11] In particular, an optimal monetary policy rule under floating exchange rates is mirrored in the following assumption:

In a floating exchange rate economy the monetary authority responds to the productivity shock, k, and adjusts its money stock as follows: $M_{Float} = \frac{M_0}{k^{\frac{1}{\nu}}}$, where $M'_{Float}(k) < 0$ and $M''_{Float}(k) > 0$.

[11] See also Ireland (1996) and Kim and Henderson (2002).

The monetary authority adopts a procyclical monetary policy under floats when responding to a productivity shock.[12] It follows that the covariance between the domestic money supply and productivity shock must be negative, so that $\sigma_{\kappa,m} < 0$. The negative covariance between productivity and money supply, $\sigma_{\kappa,m}$, provides a hedge against the uncertain occurrence of the productivity shock. More precisely, the monetary policy rule offsets the productivity shock in the floating exchange rate economy. The variance of the domestic money stock, $\sigma_m^2 = \frac{\sigma_\kappa^2}{\nu^2}$, in conjunction with its covariance with the productivity shock, $\sigma_{\kappa,m} = -\frac{\sigma_\kappa^2}{\nu}$, accommodates the productivity disturbance in the equilibrium wage equation (7). This in turn affects the expected level of utility.

Proposition 1 *The expected utility is higher under floating exchange rates than under fixed exchange rates:* $E_{-1}(U_{Float}) > E_{-1}(U_{Peg})$.

Proof. The utility function, equation (1), in expected terms reads

$$E_{-1}(U) = E_{-1}(\log C) + E_{-1}\left(\log \frac{M}{P}\right) - E_{-1}\left(k\frac{L^\nu}{\nu}\right).$$

The equilibrium consumption, C, the price level, P, and labour supply, L, are already defined. For the given path of the foreign money stock and wage level the following functional forms are defined: $\digamma_C = \log\left(\eta^\gamma\left(\left(\gamma\left(\frac{\theta-1}{\theta}\right)^{\frac{1}{\nu}}\right)^\eta\left(\frac{\gamma}{W^*}\right)^{1-\eta}\right)^\gamma\left((1-\gamma)\left(\frac{\theta-1}{\theta}\right)^{\frac{1}{\nu}}\right)^{1-\gamma}\right)$, $\digamma_P = \log\left(\frac{\left(\frac{\theta}{\theta-1}\right)^{\frac{1+\gamma(\eta-1)}{\nu}}(W^*)^{(1-\eta)\gamma}}{(\eta^\eta(1-\eta)^{1-\eta})^\gamma\gamma^\gamma(1-\gamma)^{1-\gamma}}\right)$ and $\digamma_L = \left(\left(\frac{\theta-1}{\theta}\right)\right)$. Utilising the money supply rules under pegs and floats the expected utility levels under fixed and floating exchange rates are derived:
Under floating exchange rates the monetary policy rule $M_{Float} = \frac{M_0}{k^{\frac{1}{\nu}}}$ provides the following variance and covariance relationships between the productivity shock and the domestic money stock: $\sigma_m^2 = \frac{\sigma_\kappa^2}{\nu^2}$ and $\sigma_{\kappa,m} = -\frac{\sigma_\kappa^2}{\nu}$. The expected utility level under floats then follows

$$E_{-1}(U_{Float}) = \frac{(1-\gamma(1-\eta))}{\nu^2}\sigma_\kappa^2 + \digamma_C - \digamma_P - \digamma_L. \tag{8}$$

Under pegs the monetary policy rule $M_{Peg} = M_0$ implies that $\sigma_m^2 = 0$ and $\sigma_{\kappa,m} = 0$. Thus, the expected level of utility under fixed exchange rates reads

$$E_{-1}(U_{Peg}) = -\frac{(1-\gamma(1-\eta))}{\nu}\sigma_\kappa^2 + \digamma_C - \digamma_P - \digamma_L. \tag{9}$$

[12] In the flexible wage equilibrium the equilibrium labour supply condition holds in any state of nature and without expectations. To see that this is also the case in the assumption made, consider its monetary policy rule: $L = \frac{M}{W} = \frac{M_0}{k^{\frac{1}{\nu}}}\left(\frac{\theta-1}{\theta}\right)^{\frac{1}{\nu}}\left(E_{-1}(k\left(\frac{M_0}{k^{\frac{1}{\nu}}}\right)^\nu)\right)^{-\frac{1}{\nu}} = \left(\frac{\theta-1}{\theta}k^{-1}\right)^{\frac{1}{\nu}}$. That is, under flexible wages the equilibrium labour supply is only affected by fluctuations that would arise in a flexible wage world. The uncertainty is resolved in a flexible wage world.

The difference between equation (8) and (9) reflects the expected relative welfare gains under floating exchange rates:

$$E_{-1}\left(U_{Float}\right) - E_{-1}\left(U_{Peg}\right) = \frac{\left(1 - \gamma\left(1 - \eta\right)\right)\left(1 + \nu\right)}{\nu^2}\sigma_\kappa^2 > 0.$$

This proves the claim made in Proposition 1. ■

The relative welfare gains under a floating exchange rate regime increase in the variance of the productivity shock, k. In other words, the relative expected utility under fixed exchange rates declines with the volatility of the productivity shock. Proposition 1 illustrates that a procyclical monetary policy becomes the optimal response in relative welfare terms when productivity changes and wages are preset. A procyclical change in the domestic money stock under floating exchange rates accommodates the productivity shock and offers an insurance against uncertainty in the economy. Therefore it can be used as a hedge against shocks to expected consumption and maximises the relative level of expected utility. Moreover, the monetary policy rule under floating exchange rates eliminates the expected utility costs from the presence of uncertainty.

As a precurser to the empirical analysis, the wage level of the domestic country is defined.

Definition 1 *The domestic wage level equals the average domestic wage level expressed in foreign currency, S. Hence, the domestic wage level is equivalent to*

$$\textit{Domestic Wage Level (DWL)} = \frac{W}{S}.$$

Definition 1 compares the cost of labour, expressed by wages, across countries, and will be used in the empirical part to analyse differences in the wage level under different exchange rate regimes.[13]

From the monetary policy rule M_{Peg} it becomes clear that the monetary authority does not respond to any changes in productivity under fixed exchange rates. Accordingly, no correlation between money stock, M, and the productivity shock, k, occurs. The monetary authority does not allow to hedge against the uncertain realisation of the productivity shock and, therefore cannot resolve uncertainty. Thus, households utilise the DWL to be compensated for the presence of uncertainty under fixed exchange rates. Under a floating exchange rate regime the monetary authority's purpose is to accommodate the productivity shock. It follows that the covariance between the domestic money supply and productivity shock must be negative, so that $\sigma_{\kappa,m} < 0$. As a result, the monetary rule provides a hedge against uncertainty in the economy. Households

[13] A similar terminology has been applied in the empirical literature on price levels. See Rogers (2001) among others. Freeman and Oostendorp (2002a) use this specification to analyse the determination of wages across countries and occupations.

use the domestic money to insure against the uncertain occurrence of the productivity shock. This affects the DWL under floating exchange rate regimes.

Proposition 2 *The expected domestic wage level under*

1. *fixed exchange rates rises with the variance of the productivity shock,* σ_κ^2.
2. *floating exchange rates declines with the variance of the productivity shock,* σ_κ^2.

Proof. To establish the claims made in part 1 and 2 of Proposition 2 notice that the expected domestic wage level equals

$$E_{-1}(\log DWL) = \frac{1}{\nu}\left(\Omega + \nu \log M_0 + \frac{\sigma_\kappa^2}{2} + \frac{\nu^2}{2}\sigma_m^2 + \nu\sigma_{\kappa,m}\right) - \Phi - \left(\log M_0 + \frac{\sigma_m^2}{2}\right). \quad (10)$$

To derive part 1 of Proposition 2, it is assumed that households under fixed exchange rates take the monetary policy rule under pegs into account when deciding about their preset wage. It follows that $\sigma_m^2 = \sigma_{\kappa,m} = 0$. Thus, to obtain the expected domestic wage level one can rewrite equation (10) as

$$E_{-1}(\log DWL_{Peg}) = \frac{\Omega}{\nu} + \frac{\sigma_\kappa^2}{2\nu} - \Phi, \text{ where } \Phi = \frac{1-\eta}{\eta}. \quad (11)$$

The claim made in part 1 of Proposition 2 immediately follows from equation (11).

To establish part 2, recall that households account for the monetary rule under floating exchange rates so that $\sigma_m^2 = \frac{\sigma_\kappa^2}{\nu^2}$ and $\sigma_{\kappa,m} = -\frac{\sigma_\kappa^2}{\nu}$. Utilising equation (10) together with the variance and covariance terms under floating exchange rates, the expected domestic wage level equals

$$\begin{aligned} E_{-1}(\log DWL_{Float}) &= \frac{1}{\nu}\left(\Omega + \nu \log M_0 + \frac{\sigma_\kappa^2}{2} + \frac{\sigma_\kappa^2}{2} - \sigma_\kappa^2\right) - \Phi - \left(\log M_0 + \frac{\sigma_\kappa^2}{2\nu^2}\right) \\ E_{-1}(\log DWL_{Float}) &= \frac{\Omega}{\nu} - \Phi - \frac{\sigma_\kappa^2}{2\nu^2} \end{aligned} \quad (12)$$

Equation (12) establishes the claim made in part 2 of Proposition 2. ■

As the monetary authority maintains a fixed exchange rate it cannot offset productivity disturbances. This creates uncertainty, σ_κ^2, in the economy and causes utility costs to fluctuate with the productivity disturbance, as illustrated in equation (9). Since wages are preset, households cannot adjust wages after the productivity shock has occurred. Consequently, to be compensated for the volatility of the productivity shock households require a wage premium under fixed exchange rates, denoted by $\frac{\sigma_\kappa^2}{2\nu}$. Under floats the monetary authority accommodates the productivity shock. Therefore, domestic money supply can be used as a hedge against shocks to consumption. This means that the real value of money will be unexpectedly high in states of nature when the marginal utility of consumption is high (meaning actual consumption is low).

Consequently, higher money volatility increases the expected future real value of money.[14] Domestic money, which is the home asset, therefore provides a hedge and makes the wage premium negative. As a result, the expected level of domestic wages is declining by the premium $\frac{\sigma_\kappa^2}{2\nu^2}$ under floating exchange rate regimes. Applying Proposition 2, the difference between equation (11) and (12) shows that the relative wage differential,

$$E_{-1}(\log DWL_{Peg}) - E_{-1}(\log DWL_{Float}) = \frac{1+\nu}{2\nu^2}\sigma_\kappa^2 > 0,$$

depends on the magnitude of uncertainty.[15] The intuition for this result is that a fixed exchange rate economy adopts a passive monetary policy rule relative to the floating exchange rate economy, which causes the expected utility costs to fluctuate with the productivity shock, k, under pegs. To be compensated for this, households require a wage premium relative to floating exchange rate economies. Hence, the following corollary should hold:

Corollary 1 *The equilibrium domestic wage level increases with the inflexibility of the exchange rate regime. Consequently,* $E_{-1}(\log DWL_{Peg}) > E_{-1}(\log DWL_{Float})$.

This corollary that the equilibrium level of domestic wages increases with the rigidity of the exchange rate regime choice is the central hypothesis of the model. In the next section the paper attempts to test this conclusion empirically.

3 Empirical Evidence

This section presents the statistical inference of developing countries' wage level in relation to their adopted exchange rate regime. In particular a cross-sectional and panel data approach will be utilised to assess the paper's main hypothesis that the level of domestic wages increases with the inflexibility of the exchange rate regime. Therefore the paper concentrates on the period 1983 to 1998. The sample consists of 38 developing countries which are depicted in Table 1.

Data

To obtain a measure of the level of domestic wages across developing countries, this paper explores Freeman and Oostendorp's (2002b) occupational wage data set. The authors transform the survey of wages, conducted by the ILO, into a consistent data file on pay in 161 occupations from 1983 to 1998. Since specific occupations vary across countries and years, a comparison between exactly the same occupation across countries would reduce the sample size too much.

[14] This follows from Jensen's inequality and convexity.

[15] At this point it is worth to note that the results derived are also valid for an external shock in form of η or a foreign money supply shock, M^*. A proof is available on request from the author.

Thus, this paper takes another approach and calculates a yearly average of a country's DWL. Observations on wages are treated as samples from the distribution of occupational wages for each country, rather than as estimates of wages for a specific occupation.[16] To construct an average wage rate of a country in a particular year, this paper concentrates on countries that report on the same occupations over time.[17] To analyse differences in wage levels across exchange rate regimes, the level of domestic wages is expressed in terms of a single currency, namely the US dollar. The deflated wages allow to capture the cost of labour across countries.

Two exchange rate classifications are explored in the empirical analysis. This paper follows the recent work by Reinhart and Rogoff (2004) and the IMF's AREAER (2002) to classify the exchange rate regimes of the 38 developing countries of interest. The AREAER report is based on the publicly stated commitment of the authorities in the countries in question. This approach is known as the de jure analysis and will be compared with the de facto classification by Reinhart and Rogoff. The authors utilise market-determined parallel exchange rates. The two classifications form the basis of the following empirical analysis. The de facto approach uses the *fine* classification codes by Reinhart and Rogoff, so that the most rigid peg is denoted by 1 and the most flexible exchange rate regime by 14. The IMF classifies eight exchange rate regimes. Similar to the de facto classification, the most rigid exchange rate arrangement equals 1 and the most flexible equals 8 in the de jure classification.

Additionally, a set of control variables is introduced. The literature on factor price equalisation defines income levels as the key determinant for differences in factor prices across countries (see for example Balassa, 1964). Freeman and Oostendorp (2002a) establish that the levels of domestic wages tend to rise with the level of income per capita. To control for differing income levels across developing countries the variable *GDP per capita* is added to the regressional analysis. It is measured in constant US dollars and taken from the World Development Indicators (WDI, 2002).[18]

A further control variable is the extent to which a country trades. The theorem by Stolper and Samuelson (1941) predicts that countries with high trade shares should experience a factor price equalisation towards the world average. Thus, trade lowers the relative dispersion in wages

[16] This paper treats occupations as units of observations. This assumption is valid as long as one is concerned with the structure of wages. However, it is true that the distribution of occupational wages will differ from the distribution of individual wages if occupations have different amounts of employees (see Freeman and Oostendorp, 2002b).

[17] For example, if Mexico consistently reports on 23 occupations over time, only these 23 occupation codes are used. On average the analysed countries report 50 occupations per year. Wages are expressed per 1000 US $.

[18] In the empirical analysis similar results are obtained, when the real GDP per capita measure by the Penn World Table 5.6. is used.

between less developed countries with relatively low levels of skills. The trade theory also allows factor prices to differ if countries operate under different technologies or degrees of competition. To capture the degree of openness to trade, the paper utilises the ratio of exports of goods and services relative to GDP (WDI, 2002) as an *openness* measure.

To account for macroeconomic heterogeneity of countries, an additional control variable is introduced. The *size* of a country is particularly important. Larger countries may be less vulnerable to real shocks, due to diversified production. However, a small open country may be able to adjust to changes in the macroeconomic environment more quickly and flexibly. A country's exchange rate regime choice is also linked to its size, since small countries may find it easier to lock onto a large one, than would two countries of similar size. The country's size is measured by total GDP, which is obtained from the WDI (2002).[19]

The empirical model also controls for macroeconomic fundamentals across countries. Therefore, in line with the theoretical model, the *volatility of money* supply will be added to the regression analysis. The volatility of money accounts for the stance of the monetary policy across countries. Especially countries which try to target inflation should experience a less volatile money stock. If the monetary authority aims at not only targeting inflation but also unemployment, money supply becomes less stable over time. This should influence expectations and the DWL of countries. Furthermore, monetary shocks can spill over into the real economy and can lead to large changes in factor prices as well as output and to prolonged periods of adjustment. To control for these effects the volatility of money is taken into account in the regressional analysis. Controlling for volatility of the money supply also allows to account for the positive relationship between the levels of domestic wages and deviations of the money supply, as predicted by the theoretical model. The volatility of money supply is calculated by a five year rolling standard deviation of the monetary aggregate M2, utilising the IMF International Financial Statistics (IFS, 2001).

A first diagnostic of the data is provided in Table 2, where the summary statistic differentiates between fixed, intermediate and floating exchange rate regimes.[20] The de facto and de jure classification show that, on average, developing countries with an intermediate exchange rate regime have higher levels of domestic wages. On average, fixed exchange rate regimes have

[19] An alternative measure of country size would be total population. Applying this variable in the empirical analysis does not change the main results of the paper.

[20] For the IMF classification the paper follows Frankel (1999) to categorise exchange rate regimes into three types: Currency unions, currency boards and truly fixed exchange rates can be specified as *fixed exchange rates*. *Intermediate regimes* comprise crawling pegs (adjustable pegs, crawling pegs and basket pegs) and dirty floats (target zone/bands or managed floats). Free floats represent a *pure float* regime. A similar approach has been taken for the de facto classification by Reinhart and Rogoff (2003).

less volatile levels of domestic wages than floating and intermediate regimes. Concentrating on GDP per capita, developing countries with an intermediate or floating exchange rate provide evidence for smaller deviations of GDP per capita. To investigate the empirical relationship between the DWL and exchange rate regimes across developing countries in more detail the next sections continue with a regressional analysis by concentrating on cross-section and panel regression analyses.

Cross-Sectional Analysis

The theoretical priors suggest an equilibrium relationship between the DWL and the exchange rate regime choice of developing countries. Therefore, the paper begins with a cross-sectional approach over the time period 1983 to 1998. All variables are simple averages over the period from 1983 to 1998. This type of approach abstracts from short-run fluctuations of the macroeconomic variables. The cross-sectional analysis also deals with the potential criticism that the results obtained only reflect the short-run effects of changes in the exchange rate regime on the level of domestic wages. For example, the economic performance that may arise from a sudden regime shift, for instance a collapse of the currency, may be wrongly assigned to the floating exchange rate regime although it is the result of the preceding periods of the regime change. The cross-sectional approach circumvents this by averaging the exchange rate variable over the period 1983 to 1998. The cross-sectional analysis allows also to focus on the level of variables, as suggested by the general equilibrium model outlined in the previous section.[21] Accordingly, the basic specification of the regression analysis can be written as follows:

$$DWL_i = \alpha + \beta y_i + \gamma Open_i + \delta ExR_i + \boldsymbol{\psi}'\mathbf{X}_i + \varepsilon_i \tag{13}$$

DWL is the wage level of country i, expressed in a common currency. First, DWL is regressed on the *log* of GDP per Capita, y, the exchange rate variable, ExR and the openness measure, *Open*. Second, size is added to the regressional analysis. Lastly, volatility of money is introduced. The last two regressors are included in the vector $\mathbf{X}$. Results of White's (1980) test for heteroskedasticity in the residuals from the OLS regression provide some evidence for the presence of heteroskedasticity. The standard errors are therefore obtained from White's consistent covariance matrix.

De Jure Classification The estimation of the DWL equation documents a negative relationship between the exchange rate regime variable and the average level of domestic wages

[21] Most of the existing literature on exchange rate regimes follows the prediction of the Dornbusch-Mundell-Fleming model and concentrates on changes and volatilities in the variables.

across countries throughout columns (1) to (3) of Table 3. The more rigid the exchange rate regime, the higher the average level of domestic wages in developing countries. The estimated δ parameter of the exchange rate regime variable ExR is statistically significant even if the standard control variables and volatility of money are added. In line with the theoretical predictions, the average DWL increases the less flexible the exchange rate regime is.

A negative relationship between wages and the flexibility of the exchange rate regime exists when variations in wealth and openness across developing countries are controlled for. The estimated β parameter of GDP per capita is statistically significant at the one percent level. The three variables are able to explain 42 percent of the variation in the data. The point coefficient of 0.09 means that a 10 percent improvement in the average domestic GDP per capita raises the average DWL by 0.9 percentage points. The estimated openness coefficient, γ, is also statistically significant at the one percent level. A 10 percentage point increase in a country's openness raises the DWL by 0.02 percentage points. Thus, a higher trade share increases the overall wage level. This might offer some support for the Stolper and Samuelson theorem, which predicts that more open developing economies should experience a factor price equalisation towards the world average. When controlling for macroeconomic heterogeneity, the exchange rate regime coefficient δ remains negative in sign and statistically significant at the five percent level (column (2)). The volatility of money, column (3), enters the regression analysis with a statistically significant and positive sign. Controlling for the stance of monetary policy reduces the point estimate of the exchange rate variable. However, the estimated exchange rate regime coefficient remains statistically significant and negative in sign. The estimated positive coefficient on volatility of money stock implies that a more volatile money supply increases the level of domestic wages in developing countries. The positive relationship confirms the theoretical prediction of the model that wages are higher the more money is volatile.

The findings for the de jure classification can be summarised as follows: The exchange rate regime variable plays an important role in explaining the level of domestic wages across developing countries. When controlling for variations in wealth, openness and size as well as money volatility, wages are positively affected by the rigidity of the nominal exchange rate, which confirms the theoretical priors discussed above. With respect to economic magnitude of the exchange rate regime choice on the DWL take column (2) of Table 3 for illustrative purposes: Consider two developing countries with distinct, however, closely related exchange rate regimes (i.e. the countries would for example have exchange rate regimes defined as 3 and 4 or 6 and 7). If the countries exhibit the same size, income level and degree of openness, the average monthly wage differential per year will be approximately 37 US $.

The above findings suggest a strong relationship between real income per capita and the level of wages across countries. To analyse whether the wealth of countries influences the relationship between the level of domestic wages and the exchange rate regime choice, columns (4)-(9) of Table 3 allow for interacting effects of the exchange rate regime and GDP per capita with an upper middle income country (UMIE) dummy, $Dummy(UMIE)$.[22] The exchange rate regime variable ExR has a negative association with the level of domestic wages in upper middle income countries throughout columns (4) to (9). For example, controlling for GDP per capita and openness in column (4) shows that the DWL increases by 0.024 percentage points when the exchange rate regime becomes more rigid while it even increases by 0.027 percentage points in lower and middle income countries. The estimated exchange rate coefficients imply that the average level of domestic wages is higher in UMIE when the exchange rate regime is more rigid. The ExR coefficient, reflecting the impact of lower and middle income economies on the level of domestic wages, is statistically significant throughout columns (4) to (6). To make predictions about the statistical significance of the exchange rate regime variables on the level of domestic wages in UMIE the paper utilises a F-test of the null hypothesis that the sum of the ExR and $ExR \cdot Dummy(UMIE)$ parameters is equal to zero. Table 3 illustrates that the null hypothesis can be rejected at the 10 and 5 percent level throughout columns (5) and (7) to (9) respectively.

Columns (7) to (9) capture the effects of differences in income levels on the DWL variable by allowing for interacting effects of GDP per capita with the UMIE dummy. The results obtained show that wealth per person impacts more strongly on the level of wages in UMIE than in lower and middle income economies. This finding is in line with the literature on factor price equalisation which shows that richer countries tend to have higher wages. The inclusion of the interaction term $y \cdot Dummy(UMIE)$ also affects the relationship between the DWL and the exchange rate regime choice. Comparing columns (4) and (7) shows that the DWL increases from 0.024 to 0.054 percentage points when the exchange rate regime of upper middle income countries' becomes more rigid and one controls for for the income level across countries, $y \cdot Dummy(UMIE)$. Overall, the results obtained are in line with the findings of the benchmark regression, columns (1)-(3), when macroeconomic heterogeneity and volatility of money are controlled for.

De Facto Classification The de jure approach constitutes the uncertainty of not knowing whether the actual policy in the country is consistent with the commitment stated in the AREAER. Thus, the results obtained above are compared to the de facto classification, which

[22] Upper middle income economies (UMIE) are defined, utilising country classification code by the WDI (2002). The following countries are included: Antigua and Barbuda, Argentina, Chile, Costa Rica, Czech Republic, Gabon, Hungary, Mauritius, Mexico, Slovakia, South Korea, Latvia, Uruguay and Venezuela. Singapore is also included. Excluding Singapore from the sample does not change the statistical results.

attempts to capture the actual exchange rate regime behaviour of countries. Columns (1) to (3) of Table 4 report the results for the complete developing country sample. Allowing for variations in the level of wealth and openness, wages are higher in developing countries the more rigid the exchange rate regime is. Throughout columns (1) to (3) the estimated coefficient on GDP per capita enters the regression specification with a statistically significant positive sign. Similarly, as for the de jure specification, the degree of openness influences the DWL positively. Including size and volatility of money stock improves the explanatory power of the empirical model (see column (3)). 42 percent of the variations in the data are explained by the statistical specification. The statistically significant positive coefficient on the volatility of money illustrates that the DWL of developing countries rises the more volatile the money supply is. Overall, the results obtained confirm the findings of the de jure classification. Similar to the de jure classification, a negative relationship between the exchange rate regime variable and the average level of domestic wages across countries is established. However, compared to the de jure classification the exchange rate regime coefficient loses its statistical significance in the developing country samples in columns (1) to (3).

Accounting for differences in income levels across countries in Columns (4) to (9) of Table 4, a statistically significant negative relationship between the DWL and the exchange rate regime variable is established in upper middle income countries when one controls for differences in income levels and their impact on the exchange rate regime. In particular, a F-test of the joint null hypothesis that the sum of the ExR and $ExR \cdot Dummy(UMIE)$ coefficients is equal to zero can consistently be rejected at the 5 percent level in columns (7) to (9) of Table 4. The columns show that *ceteris paribus*, upper middle income countries experience a higher DWL when either their GDP per capita increases or their exchange rate regime becomes more rigid. When considering a UMIE country-pair with distinct, however, closely related exchange rate regimes the average monthly wage differential per year will be approximately 39 US $ if the countries exhibit the same income level and degree of openness. Compared to the de jure specification the estimated coefficient on openness loses its statistical significance, even though it remains positive in sign. As for the benchmark regressional analysis, columns (1) to (3), including volatility of money to the regression analysis does improve the explanatory power of the model. Overall, the regressional analysis confirms the theoretical priors that the level of domestic wages increases with the inflexibility of the exchange rate regime.

Panel Regression Analysis

The previous section concentrated on the relationship between the DWL variable and the exchange rate regime choice in a cross-section of countries. In this section the paper extends the focus on the relatedness of the two variables within countries by adding the time series dimension to the regression analysis. Thus, the basic specification of the regression analysis in equation (13) consists not only of cross-sectional variation across countries i but also of variation over time, t, for the period 1983 to 1998:

$$DWL_{i,t} = \alpha + \beta y_{i,t} + \gamma Open_{i,t} + \delta ExR_{i,t} + \boldsymbol{\psi}'\mathbf{X}_{i,t} + \epsilon_{i,t} \tag{14}$$

As before, the standard errors are obtained from White's consistent covariance matrix. Since not all DWL data across countries completely cover the period 1983 to 1998, an unbalanced panel data estimation is applied. Columns (1) to (3) of Table 5 and 6 provide the estimation results for the pooled estimation while columns (4) to (6) of Table 5 and 6 allow for time dummies in the pooled regression analysis to control for common global moments and risk that affect every country in the sample in the same way. Consequently, the regression equation (14) is augmented by the time dummy τ_t. Countries that float today might peg their exchange rate tomorrow which would, as argued above, lead to a confusion of the effects of floating and fixed exchange rate regimes on the level of domestic wages. To overcome the potential criticism that the results obtained only reflect short-run effects of changes in the exchange rate regime the sample includes only observations of countries with the same exchange rate regime during three periods.

De Jure Classification Across columns (1) to (3) of Table 5 the estimated exchange rate regime coefficient is always statistically significant and has the negative sign when controlling for GDP per capita, openness, macroeconomic heterogeneity and fundamentals. The results match the theoretical priors and they are consistent with Corollary 1 which states that the DWL increases with the inflexibility of the exchange rate regime. The behaviour of the exchange rate regime variable in columns (4) to (6), which account for common global movements, provides further supporting statistically significant evidence that a wage differential between countries with fixed and floating exchange rate regimes exists: The more rigid is the exchange rate regime the higher will be the level of domestic wages. For example, the point estimates in column (4) of Table 5 illustrate that proposition. Two developing countries with distinct, however, closely related exchange rate regimes but with the same income level and degree of openness over time, reveal an approximate monthly wage differential per year of 21 US \$. Compared to the cross-sectional analysis only the estimated coefficient of GDP per capita remains statistically significant while the positive coefficient on openness does not reach standard significance levels. The empirical specification is able to explain up to 58 percent in the variation of the data.

The overall explanatory power of the empirical model improves if attention is directed to Table 7, which repeats the analysis by taking into account interacting effects of the exchange rate regime and GDP per capita variable with the upper middle income country dummy. The inclusion of the interaction terms $y \cdot Dummy(UMIE)$ and $ExR \cdot Dummy(UMIE)$ provides additional explanatory power for the pooled regression and time effect analysis. The results across columns (1) to (12) of Table 7 confirm the main findings of Table 5. In particular the ExR and $ExR \cdot Dummy(UMIE)$ variables, which reflect the impact of the exchange rate regime variable on the DWL in lower and middle as well as upper middle income countries in the sample, provide additional insides. In both country groups a negative relationship between the DWL and the exchange rate regime choice throughout columns (1) to (12) exists. For example, controlling for GDP per capita and $y \cdot Dummy(UMIE)$, as well as openness, size and volatility of money in column (6) ((12)), the DWL increases by 0.018 (0.031) percentage points when the exchange rate regime becomes more rigid in lower and middle income economies while it increases only by 0.007 (0.017) percentage points in upper middle income countries. Overall, the results of Table 7 suggest that mainly lower and middle income economies provide a statistically significant relationship between the ExR variable and the DWL throughout columns (1) to (12) since the joint null hypothesis of a Wald test that the sum of the ExR and $ExR \cdot Dummy(UMIE)$ parameters is equal to zero can only be rejected for columns (1) to (3) of Table 7.

De Facto Classification As noted earlier, the actual and publicly stated exchange rate behaviour does not necessarily coincide. Therefore, the above findings of the de jure classification are compared with the de facto specification in Table 6. Qualitatively the results are similar to those in Table 5. Given the focus of the paper, note that the coefficient estimate of the ExR variable is always negative in sign and statistically significant throughout columns (1) to (6). The results imply, in line with the predictions of the theoretical model, that the DWL increases when the country's exchange rate regime becomes more rigid. However, the point estimates of the ExR variable for the de facto classification are lower than for the de jure specification. Comparing columns (3) and (6) of Table 6, the paper finds that the effect of the ExR variable on the level domestic wages is similar in magnitude for the pooled and time effects estimation when one controls for GDP per capita, openness, size and volatility of money. As for the cross-sectional analysis the estimated coefficient of GDP per capita and volatility of money variable are positive in sign and statistically significant in column (6) of Table 6. Up to 46 percent of the variation in the data are explained by the time effect regression specification.

The results of Table 8 account for the interacting relationship of the exchange rate regime and GDP per capita variable with the upper middle income country dummy. The interacting term $ExR \cdot Dummy(UMIE)$ plays an important role in explaining the DWL of upper middle income countries throughout the panel regression analysis. The results of columns (1) to (12) of Table 8 show that the interacting term $ExR \cdot Dummy(UMIE)$ enters the regression analysis with a negative sign and a statistical significance at the 1 percent level (columns (1) to (6)). A Wald test of of the null hypothesis that the sum of the ExR and $ExR \cdot Dummy(UMIE)$ coefficients is equal to zero can be rejected and, therefore, shows that a statistically significant positive relationship between the rigidity of the exchange rate regime and the DWL in upper middle income economies throughout columns (1) to (12) exists. At a qualitative level, columns (1) to (3) and (7) to (12) illustrate that this relationship holds also in lower and middle income economies. To illustrate the economic magnitude of the exchange rate regime choice on the level of domestic wages in UMIE take the point estimates and interaction effects in column (6) of Table 8. Taking a upper middle income country-pair with the same income per capita, degree of openness, size and volatility of money but distinct exchange rate regimes the average monthly wage differential per year will be approximately equal to 15 US $ under the de facto classification.

Overall, the results provided in Table 3 to 8 support the contention that the exchange rate regime choice plays a role in determining the level of domestic wages across developing countries. Moreover, the estimation results have shown that the level of domestic wages increases the more rigid the exchange rate regime becomes. The results hold throughout lower and middle as well as upper middle income economies under both the de jure and de facto exchange rate classification.

4 Conclusion

This paper examines the effects of the exchange rate regime choice on the domestic wage level in developing countries. In addition to existing research, it explicitly illustrates that different exchange rate regimes can influence the domestic wage level of countries. The question posed in this paper is analysed in two steps: First, a formal model investigates the relationship between the exchange rate regime choice and the domestic wage level. Second, an empirical analysis of developing countries sheds light on the theoretical findings that the domestic wage level increases with the inflexibility of the exchange rate regime.

The theoretical model adopts a general equilibrium approach to offer a possible explanation for differing wage levels across exchange rate regimes. The model illustrates that a fixed exchange rate regime creates uncertainty about the level of macroeconomic variables and thereby reduces the relative expected utility under fixed exchange rates. The presence of uncertainty translates into higher expected utility costs under fixed exchange rate regimes. Households take those expected utility costs into account when deciding about their preset wage and require a wage premium relative to households under floating exchange rate regimes.

In the light of the theoretical findings, the paper empirically analyses the relationship between the domestic wage level and the exchange rate regime choice in developing countries over the time period 1983 to 1998. The empirical findings show that the exchange rate regime plays a statistically significant role in explaining wage levels across countries. Using a number of standard control variables, such as GDP per capita, openness and size, wage levels are significantly negatively affected by the flexibility of the exchange rate regime. Hence, domestic wage levels increase with the rigidity of the exchange rate regime.

Overall, the paper indicates that the choice of the exchange rate regime has an important impact on economic performance by influencing macroeconomic variables, such as the level of domestic wages, in developing countries. More precisely, the paper finds that the choice of the exchange rate regime matters for developing countries. It provides empirical evidence for a wage premium in fixed relative to floating exchange rate regimes. So far the literature on factor price equalisation has concentrated on real GDP per capita as the principal determinant for differences in factor prices across countries. This paper shows that the exchange rate regime variable can also significantly influence wage levels of countries. Hence, future research could incorporate differences in exchange rate regimes into the explanations for differing factor prices across countries.

References

[1] Abowd, J. M. and Ashenfelter. O. (1981) "Anticipated Unemployment, Temporary Layoffs and Compensating Wage Differentials" in *Studies in Labor Markets*, edited by Rosen, S., University of Chicago Press, Chicago.

[2] Balassa, B. (1964), "The Purchasing Power Parity Doctrine: A Reappraisal", *Journal of Political Economy* 72: 584-596.

[3] Branson, W. and Love, J. (1988), "United States Manufacturing and the Real Exchange Rate", in: *Misalignment of Exchange Rates: Effects on Trade and Industry*, edited by Marston, R., University of Chicago Press, Chicago.

[4] Broda, C. (2003), "Exchange Rate Regimes and National Price Levels", mimeo, Federal Reserve Bank of New York.

[5] Campa, J. and Goldberg, L. (2002), "Employment versus Wage Adjustment and the US Dollar", *Review of Economics and Statistics*, forthcoming.

[6] Corsetti, G. and Pesenti, P. (2002), "International Dimensions of optimal Monetary Policy", *NBER Working Paper* 8230.

[7] Devereux, M. (2002), "Is the Exchange Rate a Shock Absorber? Evaluating the Case for flexible Exchange Rates", mimeo, University of British Columbia.

[8] Devereux, M. and Engel, C. (2000), "Monetary Policy in the open Economy Revisited: Price Setting and Exchange rate Flexibility", *NBER Working Paper* 7665.

[9] Dornbusch, R., Fischer, S. and Samuelson, P.A. (1977), "Comparative Advantage, Trade, and Payments in a Ricardian Model with a continuum of Goods", *American Economic Review* 67: 823-839.

[10] Frankel, J.A. (1999), "No Single Currency Regime is Right for all Countries or at all Times", *NBER Working Paper* 7338.

[11] Freeman, R.B. and Oostendorp, R.H (2002 a), "Wages around the World: Pay across Occupations and Countries", in *Inequality around the World*, edited by Freeman, R.B., Pelgrave, London.

[12] Freeman, R.B. and Oostendorp, R.H (2002 b), "Wages around the World: Data File", *International Labour Review* 140: 379-401.

[13] Friedman, M. (1953), "The Case for Flexible Exchange Rates", in: *Essays in Positive Economics*, University of Chicago, Chicago.

[14] Goldberg, L. and Tracy, J. (2001), " Exchange Rates and Wages", *NBER Working Paper* 5874.

[15] Gourinchas, P.O. (1998), " Exchange Rates and Jobs: What do we learn from Job Flows?" *NBER Macroeconomics Annual:* 153-208.

[16] International Monetary Fund (2001), *International Financial Statistics: CD-Rom*, Washington.

[17] International Monetary Fund (2002), *Annual Report on Exchange Arrangements and Exchange Restrictions*, Washington.

[18] Ireland, P.N. (1996), "The Role of Countercyclical Monetary Policy", *Journal of Political Economy* 104: 704-723.

[19] Lane, P.R. (2001), "The New Open Macroeconomics: A Survey", *Journal of International Economics* 54: 235-266.

[20] Lane, P.R. (2002), "Discussion of "Net Foreign Assets and the Exchange Rate: Redux Revived" by Michele Cavallo and Fabio Ghironi", *Journal of Monetary Economics*, forthcoming.

[21] Kim, J. and Henderson, D.W. (2002), "Inflation Targeting and Nominal Income Growth Targeting: When and Why are they Suboptimal?", Board of Governors of the Federal Reserve System *International Finance Discussion Papers* 719.

[22] Lewis, K. (1996), "What Can Explain the Apparent Lack of International Consumption Risk Sharing?" *Journal of Political Economy* 104: 267-97.

[23] Mundell, R.A. (1961), "A Theory of Optimum Currency Areas", *American Economic Review* 51: 657-665.

[24] Obstfeld, M. and Rogoff, K. (2000) "New Directions for Stochastic Open Economy Models", *Journal of International Economics* 50: 117-153.

[25] Reinhart, C. M. and Rogoff, K. (2004), "The Modern History of Exchange Rate Arrangements: A Reinterpretation", *Quarterly Journal of Economics* forthcoming.

[26] Rogers, J. H. (2001), "Price Level Convergence, relative Prices and Inflation in Europe", mimeo, Board of Governors of the Federal Reserve System.

[27] Sachs, J. (1980), "Wages, Flexible Exchange Rates and Macroeconomic Policy", *Quarterly Journal of Economics* 94: 731-747.

[28] Stolper, W. and Samuelson, P.A. (1941), "Protection and Wages", *Review of Economics and Statistics* 9: 58-73.

[29] White, H. (1980), “A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity”, *Econometrica* 48: 817-838.

[30] World Bank (2002) *World Development Indicators CD-Rom*, Washington.

Developing Country Sample			
Algeria	Dominican Republic	Mexico	Surinam
Antigua and Barbuda	Gabon	Myanmar	Thailand
Argentina	Honduras	Nicaragua	Togo
Bolivia	Hungary	Niger	Tunisia
Cameroon	India	Peru	Turkey
Central African Republic	Korea (South)	Philippines	Uruguay
Chile	Latvia	Romania	Venezuela
China	Madagascar	Singapore	Zambia
Costa Rica	Mali	Slovakia	
Czech Republic	Mauritius	Sri Lanka	

Table 1: Country List.

Variables	De Facto Classification				De Jure Classification			
	Mean	StDev	Max	Min	Mean	StDev	Max	Min
Developing Countries:								
Fixed Exchange Rate:								
DWL	0.25	0.13	0.49	0.13	0.21	0.03	0.22	0.17
log(GDP/Capita)	7.02	1.30	8.92	5.43	7.06	1.44	9.09	5.34
Intermediate Regime:								
DWL	0.33	0.33	1.29	0.05	0.29	0.21	0.95	0.05
log(GDP/Capita)	7.58	1.08	9.67	5.64	7.42	1.15	9.78	5.44
Floating Exchange Rate								
DWL	0.30	0.22	0.79	0.06	0.25	0.25	0.75	0.04
log(GDP/Capita)	7.73	1.11	9.82	5.55	7.63	1.19	9.84	5.47

Table 2: Summary Statistics.

Explanatory Variables									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Exchange Rate Regime (IMF)	-0.027** (2.063)	-0.037** (2.232)	-0.031* (1.916)	-0.027** (2.002)	-0.037** (2.208)	-0.031* (1.911)	-0.012 (1.089)	-0.023 (1.502)	-0.166 (1.312)
Exchange Rate Regime (IMF)·Dummy(UMIE)				0.003 (0.212)	0.001 (0.095)	0.007 (0.187)	-0.042* (1.790)	-0.045* (1.700)	-0.044 (1.554)
log(GDP/Capita)	0.089*** (3.003)	0.077*** (2.812)	0.084*** (2.935)	0.085** (2.408)	0.075** (2.246)	0.080** (2.251)	0.065* (1.946)	0.054* (1.764)	0.058* (1.848)
log(GDP/Capita)·Dummy(UMIE)							0.035* (1.888)	0.036* (1.791)	0.036* (1.709)
Openness	0.002*** (2.702)	0.002*** (3.810)	0.002*** (3.605)	0.002*** (2.615)	0.002*** (3.671)	0.002*** (3.617)	0.002** (2.389)	0.003*** (3.475)	0.002** (2.423)
log(Size)		0.019 (1.014)	0.015 (0.790)		0.019 (0.987)	0.014 (0.763)		0.020 (1.049)	0.015 (0.839)
Volatility of Money			0.0004* (1.825)			0.0004* (1.812)			0.0004 (1.612)
F-statistic (Coef. on $ExR + ExR \cdot Dummy = 0$); p-values reported:				0.159	0.099*	0.152	0.014**	0.018**	0.039**
R^2	0.47	0.49	0.52	0.47	0.49	0.52	0.49	0.52	0.55
adj. R^2	0.42	0.43	0.45	0.41	0.41	0.43	0.42	0.42	0.44
SE	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.15
Sample Size	38	38	38	38	38	38	38	38	38

Table 3: Regression Results (De Jure Classification): Columns (1)-(3) all countries; (4)-(9) controlling for upper middle income economies (UMIE). *Note: Dependent variable: Domestic Wage Level. Time period 1983-98. t-Statistics in absolute values. *** Significance at the 1, ** at the 5, * at the 10 percent Level.*

Explanatory Variables									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Exchange Rate Regime (Reinhart and Rogoff)	-0.004	-0.005	-0.007	-0.004	-0.005	-0.007	0.005	0.005	0.002
	(0.612)	(0.651)	(0.985)	(0.552)	(0.597)	(0.922)	(0.959)	(0.822)	(0.307)
Exchange Rate Regime (Reinhart and Rogoff)·Dummy(UMIE)				-0.003	-0.0032	-0.002	-0.044**	-0.044**	-0.041**
				(0.360)	(0.376)	(0.259)	(2.597)	(2.479)	(2.144)
log(GDP/Capita)	0.085**	0.082**	0.091***	0.093**	0.089**	0.097**	0.062**	0.057*	0.065**
	(2.605)	(2.624)	(2.911)	(2.156)	(2.147)	(2.312)	(1.989)	(1.932)	(2.256)
log(GDP/Capita)·Dummy(UMIE)							0.055***	0.056***	0.052**
							(2.938)	(2.875)	(2.513)
Openness	0.002**	0.002***	0.002***	0.002**	0.002***	0.002***	0.0008	0.0009	0.0009
	(2.458)	(3.123)	(2.981)	(2.404)	(3.017)	(2.904)	(0.769)	(1.041)	(1.067)
log(Size)		0.005	0.004		0.006	0.004		0.008	0.006
		(0.309)	(0.219)		(0.332)	(0.235)		(0.537)	(0.437)
Volatility of Money			0.0004***			0.0004**			0.0004*
			(2.657)			(2.564)			(1.778)
F-statistic (Coef. on $ExR + ExR \cdot Dummy = 0$); p-values reported:				0.441	0.438	0.345	0.021**	0.032**	0.045**
R^2	0.44	0.44	0.50	0.44	0.44	0.50	0.54	0.55	0.59
adj. R^2	0.39	0.37	0.42	0.37	0.36	0.40	0.57	0.46	0.49
SE	0.16	0.15	0.16	0.17	0.17	0.16	0.15-	0.15	0.15
Sample Size	38	38	38	38	38	38	38	38	38

Table 4: Regression Results (De Facto Classification): Columns (1)-(3) all countries; (4)-(9) controlling for upper middle income economies (UMIE). *Note: Dependent variable: Domestic Wage Level. Time period 1983-98. t-Statistics in absolute values. *** Significance at the 1, ** at the 5, * at the 10 percent Level.*

Explanatory Variables						
	(1)	(2)	(3)	(4)	(5)	(6)
Exchange Rate Regime (IMF)	-0.015*** (2.807)	-0.013** (2.259)	-0.013** (2.414)	-0.021*** (3.157)	-0.02*** (2.662)	-0.017** (2.380)
log(GDP/Capita)	0.35*** (8.768)	0.362*** (9.740)	0.368*** (9.726)	0.334*** (8.057)	0.337*** (8.599)	0.344*** (8.551)
Openness	0.0003 (0.519)	0.0001 (0.266)	0.0001 (0.273)	0.0002 (0.336)	0.0001 (0.262)	0.0002 (0.262)
log(Size)		-0.017 (1.073)	-0.015 (0.854)		-0.005 (0.259)	-0.007 (0.433)
Volatility of Money			0.0002 (0.811)			-0.0005 (1.558)
adj. R^2	0.57	0.57	0.58	0.45	0.45	0.48
Observations	177	177	177	177	177	177

Table 5: Regression Results for the Pooled Regression Analysis (De Jure Classification): Columns (1)-(3) pooled estimation; (4)-(6) pooled estimation with time dummies. *Note: Dependent variable: Domestic Wage Level. Time period 1983-98. t-Statistics in absolute values. *** Significance at the 1, ** at the 5, * at the 10 percent Level.*

Explanatory Variables						
	(1)	(2)	(3)	(4)	(5)	(6)
Exchange Rate Regime (Reinhart and Rogoff)	-0.006** (2.099)	-0.005* (1.875)	-0.006** (2.041)	-0.006** (1.961)	-0.006* (1.748)	-0.007** (2.032)
log(GDP/Capita)	0.350*** (8.847)	0.369*** (10.196)	0.375*** (10.152)	0.348*** (8.891)	0.365*** (9.944)	0.373*** (9.929)
Openness	-0.0006 (0.137)	-0.0002 (0.441)	-0.0002 (0.427)	-0.0002 (0.485)	-0.0004 (0.805)	-0.0003 (0.742)
log(Size)		-0.026* (1.630)	-0.026 (1.589)		-0.024 (1.485)	-0.024 (1.462)
Volatility of Money			0.0003 (1.387)			0.0006** (1.958)
adj. R^2	0.55	0.55	0.57	0.42	0.42	0.46
Observations	199	199	199	199	199	199

Table 6: Regression Results for the Pooled Regression Analysis (De Facto Classification): Columns (1)-(3) pooled estimation; (4)-(6) pooled estimation with time dummies. *Note: Dependent variable: Domestic Wage Level. Time period 1983-98. t-Statistics in absolute values. *** Significance at the 1, ** at the 5, * at the 10 percent Level.*

Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Exchange Rate	-0.013***	-0.010*	-0.011**	-0.022***	-0.018***	-0.018***	-0.037***	-0.035***	-0.031***	-0.037***	-0.035***	-0.031***
Regime (IMF)	(2.559)	(1.831)	(2.066)	(3.358)	(2.712)	(2.644)	(4.138)	(3.623)	(3.377)	(4.088)	(3.822)	(3.279)
Exchange Rate Regime	-0.007	-0.007	-0.006	0.012	0.013	0.011	0.014	0.014	0.014	0.013	0.014	0.014
(IMF)·Dummy(UMIE)	(1.289)	(1.407)	(1.120)	(1.045)	(1.171)	(0.976)	(0.662)	(0.799)	(0.621)	(0.630)	(0.741)	(0.579)
log(GDP/Capita)	0.376***	0.392***	0.392***	0.413***	0.437***	0.431***	0.346***	0.355***	0.360***	0.339***	0.348***	0.353***
	(8.752)	(9.908)	(9.628)	(7.704)	(8.582)	(8.210)	(8.291)	(8.812)	(8.726)	(8.503)	(8.999)	(8.931)
log(GDP/Capita)·Dum-				-0.039*	-0.043*	-0.036				0.025	0.032	0.034
my(UMIE)				(1.678)	(1.923)	(1.592)				(0.311)	(0.388)	(0.401)
Openness	0.0003	0.0002	0.0002	0.0003	0.00007	0.0008	-0.00008	-0.0002	-0.0002	-0.0001	-0.0003	-0.0003
	(0.569)	(3.017)	(0.292)	(0.499)	(0.145)	(0.162)	(0.165)	(0.362)	(0.345)	(0.229)	(0.451)	(0.437)
log(Size)		-0.019	-0.017		-0.023	-0.021		-0.011	-0.0144		-0.013	-0.016
		(1.213)	(1.088)		(1.507)	(1.324)		(0.633)	(0.806)		(0.724)	(0.905)
Volatility of			0.0001			0.0009			0.0005*			0.0005*
Money			(0.648)			(0.479)			(1.662)			(1.667)
Wald-stat. χ^2 (Coef. on $ExR + ExR \cdot Dummy = 0$); p-values reported:	0.007***	0.018**	0.019**	0.327	0.584	0.459	0.198	0.179	0.168	0.192	0.186	0.175
adj. R^2	0.57	0.57	0.58	0.57	0.58	0.59	0.47	0.47	0.49	0.47	0.46	0.49
Observations	177	177	177	177	177	177	177	177	177	177	177	177

Table 7: Regression Results for the Pooled Regression Analysis (De Jure Classification): Controlling for upper middle income economies (UMIE); Columns (1)-(6) pooled estimation; (7)-(12) pooled estimation with time dummies. *Note: Dependent variable: Domestic Wage Level. Time period 1983-98. t-Statistics in absolute values. *** Significance at the 1, ** at the 5, * at the 10 percent Level.*

Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Exchange Rate Regime (Reinhart and Rogoff)	-0.002	-0.0008	-0.002	0.002	0.002	0.002	-0.004	-0.004	-0.006	-0.003	-0.003	-0.005
	(0.622)	(0.241)	(0.490)	(0.539)	(0.711)	(0.569)	(0.917)	(0.845)	(1.252)	(0.754)	(0.604)	(1.025)
Exchange Rate Regime (Reinhart and Rogoff)·Dummy(UMIE)	-0.010***	-0.011***	-0.010***	-0.017***	-0.017***	-0.017***	-0.005	-0.004	-0.002	-0.006	-0.006	-0.004
	(2.993)	(3.364)	(2.977)	(3.161)	(3.256)	(3.173)	(0.710)	(0.653)	(0.376)	(0.930)	(0.954)	(0.654)
log(GDP/Capita)	0.404***	0.437***	0.436***	0.365***	0.402***	0.394***	0.346***	0.363***	0.372***	0.332***	0.347***	0.357***
	(8.963)	(10.276)	(9.971)	(8.286)	(9.861)	(9.698)	(8.684)	(9.668)	(2.312)	(8.302)	(9.174)	(9.256)
log(GDP/Capita)·Dummy(UMIE)				0.029*	0.024	0.028*				0.060	0.083	0.076
				(1.855)	(1.555)	(1.828)				(0.884)	(1.162)	(1.058)
Openness	-0.0001	-0.0003	-0.0003	-0.0002	-0.0003	-0.0003	-0.0002	-0.0004	-0.0003	-0.0004	-0.0006	-0.0005
	(0.252)	(0.665)	(0.648)	(0.306)	(0.676)	(0.657)	(0.490)	(0.799)	(0.739)	(0.740)	(1.187)	(1.088)
log(Size)		-0.034**	-0.033**		-0.031**	-0.030**		-0.024	-0.024		-0.029*	-0.029*
		(2.291)	(2.162)		(2.111)	(1.955)		(1.442)	(1.435)		(1.796)	(1.764)
Volatility of Money			0.0001			0.0002			0.0006*			0.0006*
			(0.963)			(1.043)			(1.921)			(1.925)
Wald-stat. χ^2 (Coef. on $ExR + ExR \cdot Dummy = 0$); p-values reported:	0.003***	0.002***	0.003***	0.004***	0.008***	0.008***	0.061*	0.095*	0.093*	0.044**	0.067*	0.068*
adj. R^2	0.56	0.57	0.58	0.57	0.58	0.59	0.42	0.42	0.46	0.42	0.42	0.46
Observations	199	199	199	199	199	199	199	199	199	199	199	199

Table 8: Regression Results for the Pooled Regression Analysis (De Facto Classification): Controlling for upper middle income economies (UMIE); Columns (1)-(6) pooled estimation; (7)-(12) pooled estimation with time dummies. *Note: Dependent variable: Domestic Wage Level. Time period 1983-98. t-Statistics in absolute values. *** Significance at the 1, ** at the 5, * at the 10 percent Level.*