A Fiscal Decomposition of Unexpected Inflation: Cross-Country Estimates and Theory*

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1. Fiscal Decompositions of Unexpected Inflation

1.1. General Setup

Consider an economy with a consumption good which households value. There is a government that manages a debt composed by nominal and real bonds, possibly with different maturities. Upon maturing, real bonds deliver one unit of consumption good, while nominal bonds deliver one unit of currency. Currency is a commodity that only the government can produce, at zero cost. Households do not value it and they cannot burn it. The price of the consumption good in terms of currency is P_t.

The government brings from period $t-1$ a schedule $\{B^n_{N,t-1}\}$ of nominal bonds and $\{B^n_{R,t-1}\}$ of real bonds, where n denotes maturity. In period t, the government pays for maturing debt $B^1_{N,t-1} + P_t B^1_{R,t-1}$ and public spending G_t using currency. It retires currency from circulation by charging taxes $P_t T_t$ and selling new issues of nominal $Q^n_{N,t}(B^n_{N,t} - Q^{n-1}_{N,t-1})$ and real $P_t Q^n_{R,t}(B^n_{R,t} - Q^{n-1}_{R,t-1})$ bonds (both can be negative). The difference between currency introduced and retired by government trading changes private sector's aggregate holdings of it, M_t. Therefore:

$$B^1_{N,t-1} + P_t B^1_{R,t-1} + P_t G_t = P_t T_t + \sum_{n=1}^{\infty} Q^n_{N,t}\left(B^n_{N,t} - B^n_{N,t-1}\right) + P_t \sum_{n=1}^{\infty} Q^n_{R,t}\left(B^n_{R,t} - B^n_{R,t-1}\right) + \Delta M_t$$

where $Q^n_{N,t}$ is the price of nominal bonds and $P_t Q^n_{R,t}$ is the price of real bonds (I state prices in currency units). I assume households do not hold currency, so $M_t = 0$.[1] The equation above can be written as

$$(1 + r^N_t)\mathcal{V}_{N,t-1} + (1 + r^R_t)(1 + \pi_t)\mathcal{V}_{R,t-1} = P_t S_t + \mathcal{V}_{N,t} + \mathcal{V}_{R,t}$$

where $S_t = T_t - G_t$ is the primary surplus, $1 + \pi_t = P_t / P_{t-1}$ is the inflation rate,

$$\mathcal{V}_{N,t} = \sum_{n=1}^{\infty} Q^n_{N,t} B^n_{N,t} \qquad \mathcal{V}_{R,t} = P_t \sum_{n=1}^{\infty} Q^n_{R,t} B^n_{R,t}$$

are the end-of-period nominal values of nominal and real debt, and

$$1 + r^N_t = \frac{\sum_{n=1}^{\infty} Q^{n-1}_{N,t} B^n_{N,t-1}}{\mathcal{V}_{N,t-1}} \qquad (1 + \pi_t)(1 + r^N_t) = \frac{P_t}{P_{t-1}} \frac{\sum_{n=1}^{\infty} Q^{n-1}_{R,t} B^n_{R,t-1}}{\mathcal{V}_{R,t-1}}$$

are nominal returns on holdings of the basket of nominal and real bonds.

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[1] The main implication of $M = 0$ to us is the absence of seignorage revenues. These are small for the countries in our sample.

Let $\delta_t = \mathcal{V}_{N,t}/\mathcal{V}_t$ be the relative share of nominal on overall debt, at market prices. We assume that governments keep this share constant at δ. Therefore, we can define the nominal return on the entire basket of public bonds as

$$1 + r_t^n = \delta(1 + r_t^N) + (1 - \delta)(1 + r_t^R)(1 + \pi_t). \tag{1}$$

Let $\mathcal{V}_t = \mathcal{V}_{N,t} + \mathcal{V}_{R,t}$ be the end-of-period market value of public debt. Since public debt and surpluses are not stationary in the data, I detrend both using gross domestic product Y_t. Define $V_t = \mathcal{V}_t/(P_t Y_t)$ as the real debt-to-GDP ratio and $s_t = S_t/P_t$ as the surplus-to-GDP ratio.

If $P_t = 0$, households demand infinite goods, and there is no equilibrium. So $P_t > 0$. From the last flow equation for public debt, we get:

$$\frac{1 + r_t^n}{(1 + \pi_t)(1 + g_t)} V_{t-1} = s_t + \frac{\Delta M_t}{P_t} + V_t, \tag{2}$$

where g_t is the growth rate of GDP. Equation (2) provides a law of motion for the real market value of public debt. The left-hand side contains the beginning-of-period (but after bond prices change) real market value of debt. Define $\beta_t = (1 + \pi_t)(1 + g_t)/(1 + r_t^n)$ as the *ex-post*, growth-adjusted real discount for public bonds, and $\beta_{t,t+j} = \prod_{\tau=t}^{t+j} \beta_\tau$. Since V_t satisfies (2), it also satisfies

$$\frac{V_{t-1}}{\beta_t} = \sum_{j=0}^{k} \beta_{t+1,t+j} \left(s_{t+i} + \frac{\Delta M_{t+j}}{P_{t+j}} \right) + \beta_{t+1,t+k} V_{t+k} \qquad \text{for any } k \geq 0$$

regardless of prices and choices. The key assumption I make in this paper is the following transversality condition, which in most structural models holds as an optimality condition of households' consumption-savings problem:

$$\lim_{j \to \infty} \beta_{t,t+j} V_{t+j} = 0 \text{ at every period } t. \tag{3}$$

The interpretation of (3) depends on whether the government uses nominal debt, that is, if $delta > 0$. If all debt is real, $\delta = 0$, (3) represents a no-default condition. If the limit is positive, there are paths of primary surpluses that lead public debt to explode. The government eventually defaults.

If $\delta > 0$ - that the case we consider in this paper -, the government has no constraint on its choice of surpluses, as long as households attribute value to currency[1] Condition (3) becomes a no-bubble condition, which guarantees that the market value of debt equals discounted surpluses:

$$\frac{V_{t-1}}{\beta_t} = \sum_{j=0}^{\infty} E_t \left[\beta_{t+1,t+j} s_{t+j} \right]. \tag{4}$$

Equation (4) is the valuation equation of public debt. Households redeem bonds for currency and can trade currency for taxes, which have real value. Therefore, the stream of surpluses provide value for currency and the public debt, and determine the price level.[2]

The valuation equation is a rather general equilibrium condition. It does not depend on equilibrium selection mechanisms (fiscal theory or spiral threat) and it holds in any model in which the no-bubble condition (3) holds.

[1] The government needs only to ensure that $\sum_{j=0}^{\infty} E_t \beta_{t+1,t+j} s_{t+j} > (1 + r_t^R)\mathcal{V}_{R,t-1}/Y_t$ for a positive price level.

[2] Again, the valuation equation determines the price level provided that $\delta > 0$. Note that time-t price level only shows up in the denominator of $\mathcal{V}_N$ on the left-hand side of (4):

$$\frac{V_{t-1}}{\beta_t} = (1 + r_t^N) \frac{\mathcal{V}_{N,t-1}}{P_t Y_t} + (1 + r_t^R) \frac{\mathcal{V}_{R,t-1}}{Y_t}.$$

1.2. The Marked-to-Market Decomposition

The fiscal decomposition I study in this paper centers around the valuation equation (4). However, working with linearized equations is more tractable and allows estimates based on vector autoregressions. So I linearize (1) and (2) to find

$$r_t^n = \delta r_t^N + (1-\delta)\left(r_t^R + \pi_t\right) \tag{5}$$

$$\beta\left(v_t + \frac{s_t}{V}\right) = v_{t-1} + r_t^n - \pi_t - g_t, \tag{6}$$

where $\beta = (1+g)(1+\pi)/(1+r^n)$ and symbols without t subscripts (like V) correspond to steady-state values. To save notation, I re-define all variables above as deviations from the steady state. Additionally, I re-define growth rates r_t^n, r_t^N, r_t^R, π_t and g_t as log-growth rates. Finally, $v_t = \log(V_t) - \log(V)$.

Like before, I solve the flow equation (6) forward and impose (3).

$$v_{t-1} + r_t^n - \pi_t = \frac{\beta}{V}\sum_{j=0}^{\infty}\beta^j E_t s_{t+j} + \sum_{j=0}^{\infty}\beta^j E_t g_{t+j} - \sum_{j=1}^{\infty}\beta^j E_t r_{t+j}$$

Above, I define $r_t = r_t^n - \pi_t$, the *ex-post* real return on holdings of public debt. The expression above is the linearized valuation equation of public debt.

Decomposition 1 (Marked-to-Market)**.** *Take innovations on the valuation equation of public debt to find the marked-to-market fiscal decomposition of unexpected inflation.*

$$\epsilon_{r^n,t} - \epsilon_{\pi,t} = \epsilon_{s,t} + \epsilon_{g,t} - \epsilon_{r,t} \tag{7}$$

The terms of the decomposition are $\epsilon_{r^n,t} = \Delta E_t r_t^n$, $\epsilon_{\pi,t} = \Delta E_t \pi_t$, $\epsilon_{s,t} = (\beta/V)\sum_{j=0}^{\infty}\beta^j \Delta E_t s_{t+j}$, $\epsilon_{g,t} = \sum_{j=0}^{\infty}\beta^j \Delta E_t g_{t+j}$ *and* $\epsilon_{r,t} = \sum_{j=1}^{\infty}\beta^j \Delta E_t r_{t+j}$.

The right-hand side of (7) contains revisions of discounted surpluses. These are divided between news about surplus-to-GDP ratios $\epsilon_{s,t}$, GDP growth $\epsilon_{g,t}$ and real discount rates $\epsilon_{r,t}$. The left-hand side contains the innovation to the price of public bonds $\epsilon_{r^n,t}$ in real terms. Given bond prices (this is why I call "marked-to-market"), surprise inflation $\epsilon_{\pi,t}$ devalues public debt so that its value coincides once again with discounted surpluses. We can replace equation (5) to highlight that inflation can only devalue the *nominal* portion of public debt:

$$\epsilon_{r^n,t} - \epsilon_{\pi,t} = \delta\left(\Delta E_t r_t^N - \Delta E_t \pi_t\right) + (1-\delta)\Delta E_t r_t^R.$$

A one percentage increase in the price level devalues total debt by δ%. The $1-\delta$ share of real bonds is not devalued because, in currency units, their prices grow along with the price level.

1.3. A Public Finances Model

I present a slightly more detailed public finances model, which I later use in the estimation. It also leads to a more general decomposition of unexpected inflation. The key assumption is that the government keeps a geometric maturity structure of its debt. The geometric term structure implies a tractable relationship between the short-term interest rate, inflation and bond returns. Specifically, for the slice of nominal public debt, suppose the outstanding volume of bonds decays at a rate ω_N, so that $B_{N,t}^n = \omega_N B_{N,t}^{n-1}$. Define $Q_{N,t} = \sum_{n=1}^{\infty} Q_{N,t}^n \omega_N^{n-1}$ as the weighted-average price of nominal bonds. Assume the same for real bonds, with decay rate of ω_R. Then, $\mathcal{V}_{N,t} = Q_{N,t}B_{N,t}^1$ and $\mathcal{V}_{R,t} = Q_{R,t}B_{R,t}^1$. The linearized returns on public bonds are

$$\begin{aligned} r_t^N &= (\omega_N\beta)q_{N,t} - q_{N,t-1} \\ r_t^R &= (\omega_R\beta)q_{R,t} - q_{R,t-1} \end{aligned} \tag{8}$$

where $q_{N,t} = \log Q_{N,t}$ and variables are expressed as deviations from average.[1] Expression (8) defines the return on holdings of public bonds. It also defines the price of the public debt portfolios given models for expected returns $E_t r_t^N$ and $E_t r_t^R$. In this paper, we assume risk premia to be constant (which englobes the expectations hypothesis). Therefore:

$$\begin{aligned} q_{N,t} &= (\omega_N \beta) E_t q_{N,t+1} - i_t &&= -\sum_{j=0}^{\infty} (\omega_N \beta)^j E_t i_{t+j} \\ q_{R,t} &= (\omega_R \beta) E_t q_{R,t+1} - (i_t - E_t \pi_{t+1}) &&= -\sum_{j=0}^{\infty} (\omega_R \beta)^j \left[E_t i_{t+j} - E_t \pi_{t+j+1} \right]. \end{aligned} \tag{9}$$

(The second equation above assures an expected nominal return on real debt equal to i_t.) The second equalities in each line above show the connection between short-term interest (nominal or real) and returns on debt holdings. News of higher interest lower public bond prices and lead to low returns.

Decomposition 2. *Replace* (**??**) *on decomposition* **??** *and gather terms to find*

$$\begin{aligned} \frac{\delta v}{\beta} \Delta E_t \pi_t = &-\frac{\delta v}{\beta} \sum_{k=1} (\omega \beta)^k \Delta E_t \pi_{t+k} - \sum_{k=0}^{\infty} \beta^k \Delta E_t s_{t+k}^p - \frac{v}{\beta} \sum_{k=1}^{\infty} \beta^k \Delta E_t g_{t+k} \\ &+ \frac{v}{\beta} \sum_{k=1}^{\infty} \sum_j \delta_j \beta^k (1 - \omega_j^k) \Delta E_t r_{j,t+k} + \frac{\delta_D v}{\beta} \sum_{k=0}^{\infty} (\omega_D \beta)^k \Delta E_t \Delta h_{t+k} - \frac{\delta_D v}{\beta} \sum_{k=0}^{\infty} (\omega_D \beta)^k \Delta E_t \pi_{t+k}^{US}. \end{aligned}$$

Take covariance with unexpected inflation, and divide both sides by $\delta(v/\beta)$.

$$\begin{aligned} var(\Delta E_t \pi_t) = &-cov \left[\Delta E_t \pi_t, \sum_{k=1}^{\infty} (\omega \beta)^k \Delta E_t \pi_{t+k} \right] - cov \left[\Delta E_t \pi_t, \left(\frac{\delta v}{\beta} \right)^{-1} \sum_{k=0}^{\infty} \beta^k \Delta E_t s_{t+k}^p \right] \\ &- cov \left[\Delta E_t \pi_t, \delta^{-1} \sum_{k=1}^{\infty} \beta^k \Delta E_t g_{t+k} \right] + cov \left[\Delta E_t \pi_t, \delta^{-1} \sum_{k=1}^{\infty} \sum_j \delta_j \beta^k (1 - \omega_j^k) \Delta E_t r_{j,t+k} \right] \\ &+ cov \left[\Delta E_t \pi_t, \frac{\delta_D}{\delta} \sum_{k=0}^{\infty} (\omega_D \beta)^k \Delta E_t \Delta h_{t+k} \right] - cov \left[\Delta E_t \pi_t, \frac{\delta_D}{\delta} \sum_{k=0}^{\infty} (\omega_D \beta)^k \Delta E_t \pi_{t+k}^{US} \right]. \end{aligned} \tag{10}$$

Decomposition 2 says that positive unexpected inflation must forecast either: *lower* future inflation (domestic or foreign), higher deficits, lower growth, higher real discounting or a more depreciated real exchange rate. In it, the ω terms give a clue of which terms derive from the time-t adjustment of bond prices. For example: an interest rate hike $\Delta E_t i_t$ can lead to a fall in nominal bond prices (negative $\Delta E_t rx_t$) and, by decomposition **??**, a decline in current inflation. These lower bond prices in turn forecast higher inflation. This is why the decomposition prescribes future inflation as time-t *deflationary force*, like surpluses.[2] Another way to write decomposition 2 would be

$$\begin{aligned} &-\frac{v}{\beta} \left[\delta \sum_{k=0} (\omega \beta)^k \Delta E_t \pi_{t+k} + \delta_D \sum_{k=0}^{\infty} (\omega_D \beta)^k \Delta E_t \pi_{t+k}^{US} \right] = \\ &\sum_{k=0}^{\infty} \beta^k \Delta E_t s_{t+k}^p + \frac{v}{\beta} \left[\sum_{k=1}^{\infty} \beta^k \Delta E_t g_{t+k} - \sum_{k=1}^{\infty} \sum_j \delta_j \beta^k (1 - \omega_j^k) \Delta E_t r_{j,t+k} - \delta_D \sum_{k=0}^{\infty} (\omega_D \beta)^k \Delta E_t \Delta h_{t+k} \right]. \end{aligned}$$

Writing as above has the advantage of isolating nominal on the left and real on the right, like decomposition **??**. The domestic inflation terms contains both unexpected current inflation $\Delta E_t \pi_t$ and unexpected "future inflation" $\Delta E_t \pi_{t+k}$, which means that the latter can absorb the impact of news about real variables on the former. Monetary policy can thus select the *timing* of inflation. Similar mechanisms apply to the exchange rate h_t and US inflation π_t^{US} terms that follow from dollar-linked

[1] In levels, the nominal return is $(B_{N,t-1}^1 + \omega_N Q_{N,t} B_{N,t-1}^1)/(Q_{N,t-1} B_{N,t-1}^1)$. The analogous is true for the real return.

[2] Of course, higher expected inflation means inflation is expected to grow after time t. **?** calls that mechanism "stepping on a rake" and argues it was part of the reason why 1970's US inflation kept coming back after temporary declines.

Country	ϵ_{r^n}	$-\epsilon_\pi$	$=$	ϵ_s	$+\epsilon_g$	$-\epsilon_r$
Averages	**-1.5	**-1	=	0.3	**-0.6	**-2.2
1947 (Advanced)	**-1.0	**-1	=	**-1.6	**-0.8	0.3
1960 (Advanced)	**-1.4	**-1	=	*1.1	*-0.6	**-2.9
1973 (Advanced)	**-1.7	**-1	=	-0.4	-0.4	**-1.9
1997 (Emerging)	**-1.6	**-1	=	*0.5	**-0.6	**-2.5
1947 Sample (Advanced)						
United Kingdom	**-1.2	**-1	=	**-2.9	**-0.9	**1.6
United States	**-0.8	**-1	=	-0.3	**-0.6	**-1.0
1960 Sample (Advanced)						
Canada	**-3.2	**-1	=	0.3	*-1.5	**-3.0
Denmark	**-1.3	**-1	=	0.2	-0.2	**-2.3
Japan	**-0.7	**-1	=	**2.8	**-3.1	**-1.4
Norway	**-0.7	**-1	=	0.7	*3.0	**-5.4
Sweden	**-1.4	**-1	=	**1.3	**-1.4	**-2.3
1973 Sample (Advanced)						
Australia	**-2.5	**-1	=	0.3	0.1	**-3.8
New Zealand	**-1.4	**-1	=	*1.5	**-1.7	*-2.2
South Korea	**-0.7	**-1	=	**-2.5	0.2	*0.7
Switzerland	**-2.0	**-1	=	*-0.8	0.1	**-2.3
1997 Sample (Emerging)						
Brazil	**-1.4	**-1	=	**3.4	-0.1	**-5.7
Colombia	**-4.2	**-1	=	*0.9	**-1.7	**-4.5
Czech Republic	0.1	**-1	=	*0.8	**-1.4	-0.3
Hungary	**-1.3	**-1	=	0.0	-0.2	**-2.2
India	**-0.3	**-1	=	**-1.0	-0.1	-0.1
Israel	**-2.2	**-1	=	**1.9	*-0.9	**-4.1
Mexico	**-2.6	**-1	=	*-1.6	0.3	*-2.3
Poland	**-2.0	**-1	=	**1.2	*-0.4	**-3.8
South Africa	**-1.3	**-1	=	0.5	**-1.2	**-1.6
Ukraine	**-0.5	**-1	=	**-1.1	0.0	*-0.4

Notes: The table reports the terms of the fiscal decomposition to the shock $\Delta E_t \pi_t = 1/\delta$. VAR coefficients fixed at the posterior distribution's mode. Bold indicates that 75% of the values out of 10,000 draws from posterior had the same sign as the figure reported. Bold with an asterisk indicates 90%.

Table 1: Fiscal decomposition of the shock $E\left[e_t \mid \Delta E_t \pi_t = 1/\delta\right]$

debt. Lower dollar-bond prices can be disinflationary today but forecast higher (*i.e.*, more depreciated) real exchange in the future (along with higher US inflation).

Lastly, the $(1 - \omega_j^k)$ term that multiplies $\Delta E_t r_{j,t+k}$ suggests that long-term bonds insulate inflation from real interest variation. We will that the evidence does not support that conclusion in all cases.

2. Empirical Results

Country	ϵ_{r^n}	$-\epsilon_\pi$	=	ϵ_s	$+\epsilon_g$	$-\epsilon_r$
Averages	**-0.7	**-0.3	=	0.1	0.1	**-1.2
1947 (Advanced)	**-0.8	**-0.2	=	*-0.2	0.1	**-0.8
1960 (Advanced)	**-0.7	**-0.3	=	*0.5	0.4	**-1.9
1973 (Advanced)	**-0.7	**-0.3	=	-0.3	0.3	**-1.0
1997 (Emerging)	**-0.7	**-0.3	=	*0.2	-0.1	**-1.1
1947 Sample (Advanced)						
United Kingdom	**-0.9	**-0.1	=	**-0.5	-0.1	*-0.4
United States	**-0.8	**-0.2	=	0.0	**0.2	**-1.2
1960 Sample (Advanced)						
Canada	**-0.8	**-0.2	=	*0.2	-0.1	**-1.1
Denmark	**-0.8	**-0.2	=	*0.6	*0.5	**-2.0
Japan	**-0.6	**-0.4	=	0.0	-0.2	**-0.8
Norway	**-0.6	**-0.4	=	*1.0	*1.9	**-3.9
Sweden	**-0.7	**-0.3	=	**0.7	-0.2	**-1.5
1973 Sample (Advanced)						
Australia	**-0.9	**-0.1	=	*0.5	*0.2	**-1.7
New Zealand	**-0.7	**-0.3	=	**0.8	**-0.5	**-1.3
South Korea	**-0.6	**-0.4	=	**-2.4	**1.3	0.2
Switzerland	**-0.8	**-0.2	=	-0.1	*0.2	**-1.1
1997 Sample (Emerging)						
Brazil	**-0.7	**-0.3	=	**1.4	0.1	**-2.6
Colombia	**-0.8	**-0.2	=	*0.1	**-1.3	**-0.9
Czech Republic	**-0.4	**-0.6	=	-0.1	-0.3	**-0.6
Hungary	**-0.7	**-0.3	=	*0.4	-0.2	**-1.2
India	**-0.5	**-0.5	=	-0.1	*-0.2	**-0.7
Israel	**-0.9	**-0.1	=	**0.6	-0.1	**-1.5
Mexico	**-0.8	**-0.2	=	**-0.5	*0.2	*-0.7
Poland	**-0.7	**-0.3	=	**0.5	-0.1	**-1.4
South Africa	**-0.8	**-0.2	=	-0.2	0.0	**-0.8
Ukraine	**-0.5	**-0.5	=	**-0.4	*-0.1	**-0.6

Notes: The table reports the terms of the fiscal decomposition to the shock $\Delta E_t(\text{Disc Surpluses}) = -1$. VAR coefficients fixed at the posterior distribution's mode. Bold indicates that 75% of the values out of 10,000 draws from posterior had the same sign as the figure reported. Bold with an asterisk indicates 90%.

Table 2: Fiscal decomposition of the shock $E\left[e_t \mid \Delta E_t(\text{Disc Surpluses}) = -1\right]$

Country	ϵ_{r^n}	$-\epsilon_\pi$	$=$	ϵ_s	$+\epsilon_g$	$-\epsilon_r$
Averages	**-1	**-0.2	=	0.1	**0.4	**-1.7
1947 (Advanced)	**-1	**-0.1	=	-0.2	*0.2	**-1.2
1960 (Advanced)	**-1	**-0.3	=	0.4	*0.9	**-2.6
1973 (Advanced)	**-1	**-0.3	=	-0.6	*0.7	**-1.4
1997 (Emerging)	**-1	**-0.2	=	*0.3	0.1	**-1.6
1947 Sample (Advanced)						
United Kingdom	**-1	**-0.1	=	*-0.4	-0.1	*-0.6
United States	**-1	**-0.2	=	*0.1	**0.5	**-1.7
1960 Sample (Advanced)						
Canada	**-1	**-0.2	=	*0.3	-0.1	**-1.3
Denmark	**-1	**-0.2	=	*0.8	*0.7	**-2.6
Japan	**-1	**-0.4	=	*-1.6	*1.3	**-1.1
Norway	**-1	**-0.4	=	**1.8	*2.8	**-6.0
Sweden	**-1	**-0.3	=	**0.9	-0.1	**-2.1
1973 Sample (Advanced)						
Australia	**-1	**-0.1	=	*0.7	*0.2	**-2.0
New Zealand	**-1	**-0.3	=	**1.2	**-0.5	**-2.0
South Korea	**-1	**-0.4	=	**-4.2	**2.9	0.0
Switzerland	**-1	**-0.2	=	-0.1	*0.3	**-1.4
1997 Sample (Emerging)						
Brazil	**-1	**-0.4	=	**2.0	*0.3	**-3.7
Colombia	**-1	**-0.2	=	*0.1	**-0.3	**-1.0
Czech Republic	**-1	0.1	=	**-1.2	**1.3	**-1.0
Hungary	**-1	**-0.3	=	**0.8	*-0.4	**-1.8
India	**-1	**-0.3	=	**0.7	*-0.4	**-1.6
Israel	**-1	**-0.1	=	**0.7	-0.1	**-1.7
Mexico	**-1	**-0.3	=	**-0.7	*0.3	*-0.9
Poland	**-1	**-0.3	=	**0.7	0.0	**-1.9
South Africa	**-1	**-0.2	=	*-0.4	0.2	**-1.0
Ukraine	**-1	**-0.4	=	-0.1	**-0.1	**-1.1

Notes: The table reports the terms of the fiscal decomposition to the shock $\Delta E_t r_t^n = -1$. VAR coefficients fixed at the posterior distribution's mode. Bold indicates that 75% of the values out of 10,000 draws from posterior had the same sign as the figure reported. Bold with an asterisk indicates 90%.

Table 3: Fiscal decomposition of the shock $E\left[e_t \mid \Delta E_t r_t^n = -1\right]$