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 exists 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. There is nothing special about currency. Households do not value it, and it provides no convenience for trading. The price of the consumption good in terms of currency is P_t. Households cannot burn currency.

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. At the beginning of period t, the face value of maturing debt is $B^1_{N,t-1} + P_t B^1_{R,t-1}$. The government redeems it for currency, which moves to the hands of households. Then, it announces that each household must pay T_t units of goods in taxes, payable in currency. It also announces new issues of debt $Q^n_{j,t} - Q^{n-1}_{j,t-1}$ (which can be negative) and the purchase of G_t units of consumption goods, all at market prices.[1] Nothing binds the government's choices of T_t or new bond selling. If households accept currency as payment for final goods, nothing binds the government's choice of G_t and bond purchases either.

Let M_t be private holdings of currency at the end of t. As there is no free disposal of currency, the quantity used by the government to redeem $t-1$ bonds and purchase goods is used to either pay taxes, buy new bonds or increase currency holdings:

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

where Q^N_t is the price of nominal bonds and $P_t Q^R_t$ is the price of real bonds (I state prices in currency units). We can further write the equation above as

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

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

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

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[1]The government does not need to force households to pay for taxes and new bonds in currency. All else follows if, instead, it accepts payment in goods but stands ready to exchange these goods for currency at market prices.

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

$$1 + r_t^N = \frac{\sum_{n=1}^{\infty} Q_{N,t}^{n-1} B_{N,t-1}^n}{\mathcal{V}_{N,t-1}} \qquad (1+\pi_t)(1+r_t^N) = \frac{P_t}{P_{t-1}} \frac{\sum_{n=1}^{\infty} Q_{R,t}^{n-1} B_{R,t-1}^n}{\mathcal{V}_{R,t-1}}$$

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

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 cand 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.

If $P_t = 0$, real debt equals infinity. For now, that is a possibility.

Suppose $P_t > 0$. Then we have, from the last expression,

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

where g_t is GDP growth rate. Equation (2) provides a law of motion for the real market value of public debt. It holds for all prices and all choices of money holdings, new debt sales and primary surplus.[1] The left-hand side contains the *beginning-of-period* (that is, 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

$$\frac{V_{t-1}}{\beta_t} = \sum_{j=0}^{k} \beta_{t+1,t+j} \left(s_{t+i} + \frac{\Delta M_{t+j}}{P_{t+j}} \right) + \beta_{t+1,t+k} V_{t+k} \qquad \text{for any } k \geq 0 \tag{3}$$

regardless of prices and choices. Expressions (2) and (3) do not represent a constraint on the path of surpluses $\{s_t\}$ and bond sales $\{V_t\}$ the government chooses to follow. They merely express future debt given paths for quantities and prices.

So far, all we did was public finances accounting. I now move to economic behavior. If $P_t = 0$, non-satiable households demand infinite final goods and there is no equilibrium. Therefore $P_t > 0$. Given a utility function over consumption paths $U(\{c_t\})$, the optimal consumption-savings choice involves two conditions. First: $\beta_{t,t+k} = U$-implied marginal rate of substitution between time-t and time-$t+k$ consumption. Second, the transversality condition $\lim_{j\to\infty} \beta_{t,t+j} V_{t+j} \leq 0$. Coupled with a no-Ponzi condition that establishes the reverse inequality, it implies

$$\lim_{j\to\infty} \beta_{t,t+j} V_{t+j} = 0 \text{ at every period } t. \tag{4}$$

If bonds are redeemable in goods *only* ($\delta = 0$), (4) represents a debt sustainability condition, as it forces the government to eventually tax enough consumption goods to pay for past borrowing. In the presence of nominal debt, however, the government has no constraints on its choice of debt and surplus.

Since households do not value currency, they do not hold it from one period to the other, $M_t = 0$.[2]

[1] Strictly speaking, (2) holds for all *feasible* choices of money holdings, that is, choices that respect households' budget constraint. Otherwise, one could point out that, for $V_{t-1} > 0$, $M_t = M_{t-1}$ and $s_t = V_t = 0$ violates (2). That would nevertheless involve households burning up currency.

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

Replacing (4) on (3) and taking expectation yields the valuation equation of public debt.

$$\frac{V_{t-1}}{\beta_t} = \sum_{j=0}^{\infty} E_t \left[\beta_{t+1,t+j} s_{t+j}\right]. \tag{5}$$

The real market value of public debt at the beginning of any period equals expected future discounted surpluses. In the presence of nominal debt, expression (5) is a *valuation equation*. Households redeem bonds for currency and can use currency for trade for something with real value (tax payments). Therefore, the value of the stock of debt is given by the discounted stream of surpluses. Accordingly, assumption (4) can be interpreted as a no-bubble condition: market prices should reflect intrinsic value.

Equation (5) does not depend on equilibrium selection mechanisms. It holds in any model in which the no-bubble condition (4) holds.

1.2. *The Marked-to-Market Decomposition*

The fiscal decomposition I study in this paper centers around the valuation equation (5). However, working with linearized equations is more tractable and allows estimations using vector autoregressions. So I linearize (1) and (2) to find

$$r_t^n = \delta r_t^N + (1-\delta)\left(r_t^R + \pi_t\right) \tag{6}$$

$$\beta\left(v_t + \frac{s_t}{V}\right) = v_{t-1} + r_t^n - \pi_t - g_t, \tag{7}$$

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 (7) forward and impose (4).

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

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 of public debt to find the market-to-market fiscal decomposition of unexpected inflation.*

$$\epsilon_{r^n,t} - \epsilon_{\pi,t} = \epsilon_{s,t} + \epsilon_{g,t} - \epsilon_{r,t} \tag{8}$$

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 of (8) 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, surprise inflation $\epsilon_{\pi,t}$ devalues public debt so that its value coincides once again with discounted surpluses. This is why I call this decomposition *marked-to-market*. The left-hand side also gives the unexpected component of the real return on holdings of the basket of public debt.

1.3. *A Public Finances Model*

1.3.1. *Geometric Term Structure*

I assume the government keeps a geometric maturity structure of its debt. The geometric term structure implies a tractable relationship between short-term interest rate $i_{j,t}$ and the excess returns that I explore to substitute the hard-to-interpret price adjustment terms of decomposition **??**.

The term structure is constant over time, but can vary across the different currency portfolios $\{j\}$ of public debt. Specifically, for the slice of public debt linked to currency j, suppose the outstanding volume of bonds decays at a rate ω_j, so that $B^n_{j,t} = \omega_j B^{n-1}_{j,t}$. Define $Q_{j,t} = \sum_{n=1}^{\infty} Q^n_{j,t}\omega_j^{n-1}$ as the weighted-average price of currency j public bonds. Then, $\mathcal{V}_{j,t} = Q_{j,t}B^1_{j,t}$. The total return on currency-j bonds then is $1 + rx_{j,t} + i_{j,t-1} = (1 + \omega_j Q_{j,t})/Q_{j,t-1}$, which I linearize as

$$rx_{j,t} + i_{j,t-1} = (\omega_j\beta)q_{j,t} - q_{j,t-1} \tag{9}$$

where $q_{j,t} = \log Q_{j,t}$ and I use the log approximation of percentage returns to re-define $rx_{j,t} + i_{j,t}$ again.

Equation (9) above defines the excess return on holdings of the j-currency portfolio of public debt. Given a model for the risk premium $E_t rx_{j,t+1}$, it also defines the price of the debt portfolio as a function of short-term interest:

$$\begin{aligned} q_{j,t} &= (\omega_j\beta)E_t q_{j,t+1} - E_t rx_{j,t+1} - i_{j,t} \\ &= -\sum_{k=0}^{\infty}(\omega_j\beta)^k E_t\left[rx_{j,t+1+k} + i_{j,t+k}\right]. \end{aligned} \tag{10}$$

The second equation in (10) shows the connection between short-term interest - hence monetary policy - and returns on debt holdings. News of higher interest lower public bond price q and leads to a low excess return. Now, lag equation (10) one period and take innovations to find

$$\begin{aligned} \Delta E_t rx_{j,t} &= -\sum_{k=1}^{\infty}(\omega_j\beta)^k\left[\Delta E_t rx_{j,t+k} + \Delta E_t i_{j,t+k-1}\right] \\ &= -\sum_{k=1}^{\infty}(\omega_j\beta)^k\left[\Delta E_t r_{j,t+k} + \Delta E_t \pi_{j,t+k} - \Delta E_t \Delta h_{j,t+k}\right]. \end{aligned} \tag{11}$$

Decomposition 2. *Replace* (11) *on decomposition* **??** *and gather terms to find*

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

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

$$\begin{aligned} var(\Delta E_t\pi_t) = &-cov\left[\Delta E_t\pi_t, \sum_{k=1}^{\infty}(\omega\beta)^k\Delta E_t\pi_{t+k}\right] - cov\left[\Delta E_t\pi_t, \left(\frac{\delta v}{\beta}\right)^{-1}\sum_{k=0}^{\infty}\beta^k\Delta E_t s^p_{t+k}\right] \\ &- cov\left[\Delta E_t\pi_t, \delta^{-1}\sum_{k=1}^{\infty}\beta^k\Delta E_t g_{t+k}\right] + cov\left[\Delta E_t\pi_t, \delta^{-1}\sum_{k=1}^{\infty}\sum_j\delta_j\beta^k(1-\omega_j^k)\Delta E_t r_{j,t+k}\right] \\ &+ cov\left[\Delta E_t\pi_t, \frac{\delta_D}{\delta}\sum_{k=0}^{\infty}(\omega_D\beta)^k\Delta E_t\Delta h_{t+k}\right] - cov\left[\Delta E_t\pi_t, \frac{\delta_D}{\delta}\sum_{k=0}^{\infty}(\omega_D\beta)^k\Delta E_t\pi^{US}_{t+k}\right]. \end{aligned} \tag{12}$$

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.[1] Another way to write decomposition 2 would be

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

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 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

[1] 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 $E\left[e_t \mid \Delta E_t \pi_t = 1/\delta\right]$

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 $E\left[e_t \mid \Delta E_t r_t^n = -1\right]$