OBJECTIVE:

analyze how and to what extent sticky information (or inattentiveness) alone shapes business cycle dynamics.

THE MODEL AND ESTIMATION METHODOLOGY:

Verona (2014a) sticky-information general equilibrium model estimated using a simulated method of moments approach.

FINDINGS:

the model with pervasive inattentiveness matches several business cycle moments better than an otherwise identical model with only a subset of these frictions.

These findings reinforce the need for pervasive stickiness to mimic the inertia found in macroeconomic data.
**Sticky Actions versus Sticky Information**

To match the data, economic models need stickiness.

### Sticky Actions

- Staggered price setting with indexation
- Staggered wage setting with indexation
- Habit persistence in consumption
- Investment adjustment costs

*(e.g. Smets and Wouters, 2003 and Christiano et al., 2005)*

### Sticky Information

- It is costly for agents to collect information and to make decisions based on that information.
  - Information disseminates slowly through the population.
  - Agents are inattentive and react only with a delay to shocks.

*(e.g. Mankiw and Reis, 2002, Reis, 2006a,b and Verona, 2014b)*

Inattentiveness is the only friction, and it affects all decisions:
- Consumption, wages, prices and capital investment decisions are all based on outdated information.
Mankiw and Reis (2006) proposed the first DSGE model that features sticky information only. See also Mankiw and Reis (2007), Reis (2009a,b) and Verona (2013).
\[ k_t = \eta \sum_{\tau=0}^{\infty} (1 - \eta)^\tau \mathbb{E}_{t-\tau} \left[ \frac{1}{1 - \alpha} y_{t+1}^{FIN} - \frac{\alpha}{1 - \alpha} k_t - \frac{r}{(r + \rho)(1 - \alpha)} r_t \right] \] (1)

\[ p_t = \lambda \sum_{\tau=0}^{\infty} (1 - \lambda)^\tau \mathbb{E}_{t-\tau} \left[ p_t + \frac{\beta (w_t - p_t) + (1 - \beta) y_t - a_t}{\beta + \nu (1 - \beta)} \right] \] (2)

\[ c_t = \delta \sum_{\tau=0}^{\infty} (1 - \delta)^\tau \mathbb{E}_{t-\tau} (c_{t}^n - R_t) \] (3)

\[ w_t = \omega \sum_{\tau=0}^{\infty} (1 - \omega)^\tau \mathbb{E}_{t-\tau} \left[ p_t + \frac{\gamma}{\gamma + \psi} (w_t - p_t) + \frac{l_t}{\gamma + \psi} + \frac{\psi}{\gamma + \psi} (c_{t}^n - R_t) \right] \] (4)

⇒ a fraction \( \eta \) of capital-investing firms, \( \lambda \) of price-setting firms, \( \delta \) of consumers and \( \omega \) of workers obtain new information and make their optimal plans every quarter.
**BUSINESS CYCLE MOMENTS - MODELS†‡ versus US DATA‡**

<table>
<thead>
<tr>
<th></th>
<th>standard deviation</th>
<th>autocorrelation</th>
<th>correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\sigma_y$</td>
<td>$\sigma_i/\sigma_y$</td>
<td>$\sigma_c/\sigma_y$</td>
</tr>
<tr>
<td>data (1966 Q1 - 2004 Q4)</td>
<td>1.58</td>
<td>3.22</td>
<td>0.76</td>
</tr>
<tr>
<td>model ($\eta^* = 0.08$, $\lambda^* = 0.28$, $\omega^* = 0.86$, $\delta^* = 0.34$)</td>
<td>1.58</td>
<td>3.87</td>
<td>0.96</td>
</tr>
<tr>
<td>model ($\eta = 1$)</td>
<td>1.58</td>
<td>3.38</td>
<td>0.21</td>
</tr>
<tr>
<td>model ($\lambda = 1$)</td>
<td>1.58</td>
<td>6.67</td>
<td>1.22</td>
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<tr>
<td>model ($\omega = 1$)</td>
<td>1.58</td>
<td>3.87</td>
<td>0.96</td>
</tr>
<tr>
<td>model ($\delta = 1$)</td>
<td>1.58</td>
<td>2.70</td>
<td>0.82</td>
</tr>
</tbody>
</table>

† All simulations were conducted with Dynare version 4.3.0 considering 32 lags in equations (1)-(4). Each model’s moment was calculated by averaging it over 1000 simulations each 156-periods long (as the sample in the data), after applying the HP-filter (with smoothing parameter equal to 1600). The standard deviations of the shocks (technology and monetary policy) were chosen so that the model reproduces the volatility of output in the data.

‡ The computations were parallelized using the Techila technology (www.techilatechnologies.com/).

‡‡ All data were taken from the FRED database. The moments were computed after applying the HP-filter (with smoothing parameter equal to 1600) to the natural logarithm of each series.
Ongoing and Future Works

- estimate the model using Bayesian methods
- horse race: sticky-actions (e.g. Smets and Wouters, 2003) versus sticky-information models

References


Verona, Fabio. (2014b) "Investment dynamics with information costs." Journal of Money, Credit and Banking, 46(8), 1627-1656.