External Deficits in the Baltics 1995 - 2007: Catching Up or Imbalances?

Julia Lendvai & Werner Roeger

European Commission, DG ECFIN

External deficits in the Baltic States 1995 - 2007

- To what extent can it be considered equilibrium response of the economy to underlying factors?
- Where lie vulnerabilities?
- Potential imbalances?
Motivation

- Very high & increasing external deficits & indebtedness in the Baltics over the entire period
Motivation

- Very high & increasing external deficits & indebtedness in the Baltics over the entire period
- Many analysts warned of overheating / housing boom / vulnerabilities
Motivation

- Very high & increasing external deficits & indebtedness in the Baltics over the entire period
- Many analysts warned of overheating / housing boom / vulnerabilities
- Macro theory considers external deficits 'normal' in catching-up economies as long as foreign funds are well invested
Motivation

- Very high & increasing external deficits & indebtedness in the Baltics over the entire period
- Many analysts warned of overheating / housing boom / vulnerabilities
- Macro theory considers external deficits 'normal' in catching-up economies as long as foreign funds are well invested
- Question: what can be considered 'normal' and what goes beyond?
Methodology

- Calibrated dynamic general equilibrium model (QUEST)
  - Small open economy
  - Sectors: traded goods, non-traded goods, house production
  - Financial accelerator (e.g. Iacoviello, 1995)
Methodology

- Calibrated dynamic general equilibrium model (QUEST)
  - Small open economy
  - Sectors: traded goods, non-traded goods, house production
  - Financial accelerator (e.g. Iacoviello, 1995)

- Impact of three factors likely to have most contributed to driving external deficits:
  - TFP growth differentials wrt euro-area
  - Fall in external spreads
  - Increasing access to credit
Main findings

- The three factors together yield a good fit of the external deficit and other key macro variables over the period considered.
Main findings

- The three factors together yield a good fit of the external deficit and other key macro variables over the period considered.
- TFP growth found to be main driving factor until around 2001 - 'textbook catching-up phase'.
Main findings

- The three factors together yield a good fit of the external deficit and other key macro variables over the period considered.
- TFP growth found to be main driving factor until around 2001 - 'textbook catching-up phase'.
- Risk premia, easing access to credit increasingly important later - more easily reversible → growing vulnerabilities.
Main findings

- The three factors together yield a good fit of the external deficit and other key macro variables over the period considered.
- TFP growth found to be main driving factor until around 2001 - ’textbook catching-up phase’
- Risk premia, easing access to credit increasingly important later - more easily reversible → growing vulnerabilities
- Role of expectations
Outline

1. Baltic States - Some facts
2. Model description
3. Simulation results
4. Concluding remarks
Some Facts

- Very high GDP growth rates: around 7% p.a.
- Domestically driven: consumption, especially investment growth exceeded GDP growth
- Very high trade deficits
- Starting from beginning of this decade this pattern became more accentuated
### Some Facts cont’d

<table>
<thead>
<tr>
<th>Estonia</th>
<th>95-00</th>
<th>01-07</th>
<th>95-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Account Balance(^{(i)})</td>
<td>$-7.5$</td>
<td>$-10.8$</td>
<td>$-9.3$</td>
</tr>
<tr>
<td>Trade Balance(^{(i)})</td>
<td>$-8.0$</td>
<td>$-7.4$</td>
<td>$-7.7$</td>
</tr>
<tr>
<td>GDP(^{(ii)})</td>
<td>$6.0$</td>
<td>$8.5$</td>
<td>$7.5$</td>
</tr>
<tr>
<td>Household consumption(^{(ii)})</td>
<td>$7.1$</td>
<td>$9.9$</td>
<td>$8.7$</td>
</tr>
<tr>
<td>Investment(^{(ii)})</td>
<td>$11.1$</td>
<td>$13.7$</td>
<td>$12.6$</td>
</tr>
<tr>
<td>Housing investment(^{(ii)})</td>
<td>$7.9$</td>
<td>$23.9$</td>
<td>$17.0$</td>
</tr>
</tbody>
</table>
### Some Facts cont’d

<table>
<thead>
<tr>
<th>Latvia</th>
<th>95-00</th>
<th>01-07</th>
<th>95-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Account Balance&lt;sup&gt;(i)&lt;/sup&gt;</td>
<td>−5.4</td>
<td>−12.2</td>
<td>−9.0</td>
</tr>
<tr>
<td>Trade Balance&lt;sup&gt;(i)&lt;/sup&gt;</td>
<td>−7.4</td>
<td>−14.6</td>
<td>−11.3</td>
</tr>
<tr>
<td>GDP&lt;sup&gt;(ii)&lt;/sup&gt;</td>
<td>5.4</td>
<td>9.1</td>
<td>7.6</td>
</tr>
<tr>
<td>Household consumption&lt;sup&gt;(ii)&lt;/sup&gt;</td>
<td>5.3</td>
<td>9.5</td>
<td>8.8</td>
</tr>
<tr>
<td>Investment&lt;sup&gt;(ii)&lt;/sup&gt;</td>
<td>19.6</td>
<td>15.4</td>
<td>17.2</td>
</tr>
<tr>
<td>Housing investment&lt;sup&gt;(ii)&lt;/sup&gt;</td>
<td>10.6</td>
<td>15.7</td>
<td>13.7</td>
</tr>
</tbody>
</table>
### Some Facts cont’d

<table>
<thead>
<tr>
<th>Lithuania</th>
<th>95-00</th>
<th>01-07</th>
<th>95-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Account Balance$^{(i)}$</td>
<td>−9.5</td>
<td>−7.1</td>
<td>−8.2</td>
</tr>
<tr>
<td>Trade Balance$^{(i)}$</td>
<td>−9.8</td>
<td>−7.6</td>
<td>−8.6</td>
</tr>
<tr>
<td>GDP$^{(ii)}$</td>
<td>4.7</td>
<td>7.9</td>
<td>6.7</td>
</tr>
<tr>
<td>Household consumption$^{(ii)}$</td>
<td>5.4</td>
<td>8.4</td>
<td>6.9</td>
</tr>
<tr>
<td>Investment$^{(ii)}$</td>
<td>9.5</td>
<td>14.0</td>
<td>12.2</td>
</tr>
<tr>
<td>Housing investment$^{(ii)}$</td>
<td>−0.6</td>
<td>12.6</td>
<td>7.8</td>
</tr>
</tbody>
</table>
Catching up? Overheating? Housing bubble?

- High and increasing GDP growth, increasing housing prices and large external deficits are leading indicators of financial crises (Reinhardt & Rogoff 2008)
- Fast-growing economies attract capital leading to external deficits
Catching up? Overheating? Housing bubble?

- High and increasing GDP growth, increasing housing prices and large external deficits are leading indicators of financial crises (Reinhardt & Rogoff 2008)
- Fast - growing economies attract capital leading to external deficits
- GDP in PPS converged from around 35% of EU average in 1995 to 60% by 2007 (70% in Estonia)
- Household liabilities-to-GDP: less than 5% in 2000 - around 40% in 2007
- Housing investment-to-GDP: still relatively low in 2007 (highest in Estonia with 6%) < EU average
- In contrast: housing prices increased fourfold between 2000 and 2007 > Ireland and Spain
Catching up? Overheating? Housing bubble?

- High and increasing GDP growth, increasing housing prices and large external deficits are leading indicators of financial crises (Reinhardt & Rogoff 2008)
- Fast - growing economies attract capital leading to external deficits

- GDP in PPS converged from around 35% of EU average in 1995 to 60% by 2007 (70% in Estonia)
- Household liabilities-to-GDP: less than 5% in 2000 - around 40% in 2007
- Housing investment-to-GDP: still relatively low in 2007 (highest in Estonia with 6%) < EU average
- In contrast: housing prices increased fourfold between 2000 and 2007 > Ireland and Spain
## Potential factors 1: Productivity growth - Real convergence

<table>
<thead>
<tr>
<th></th>
<th>95-00</th>
<th>01-06</th>
<th>95-06</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Estonia</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productivity growth T sector</td>
<td>13.7</td>
<td>8.6</td>
<td>10.9</td>
</tr>
<tr>
<td>Productivity growth NT sector</td>
<td>5.4</td>
<td>5.6</td>
<td>5.5</td>
</tr>
<tr>
<td><strong>Latvia</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productivity growth T sector</td>
<td>8.0</td>
<td>7.3</td>
<td>7.8</td>
</tr>
<tr>
<td>Productivity growth NT sector</td>
<td>4.4</td>
<td>6.2</td>
<td>5.2</td>
</tr>
<tr>
<td><strong>Lithuania</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productivity growth T sector</td>
<td>6.8</td>
<td>8.9</td>
<td>8.7</td>
</tr>
<tr>
<td>Productivity growth NT sector</td>
<td>4.1</td>
<td>5.0</td>
<td>4.8</td>
</tr>
<tr>
<td><strong>Euro Area</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productivity growth T sector</td>
<td>3.2</td>
<td>2.4</td>
<td>2.7</td>
</tr>
<tr>
<td>Productivity growth NT sector</td>
<td>0.5</td>
<td>0.2</td>
<td>0.3</td>
</tr>
</tbody>
</table>
Potential factors 2: Fall in spreads

- Luengnaruemitchai & Schadler (2007): 50 - 100 bp advantage wrt emerging markets with similar fundamentals since 2003
- Bems & Joensson (2005): also point to role of falling premia
- UIP based: 100 bp difference between the pre-Russian-crisis and post-Russian-crisis average
- NOTE: institutional factors
Potential factors 3: Easing access to credit

![Graph showing loan to individuals / GDP (%) for EE, LT, and LV over years 1995 to 2007. The graph indicates a significant increase in loan-to-GDP ratio for all three countries, with a particularly sharp rise for EE starting from 2003.](image-url)
Model

Small open economy DGE model

- Traded, non-traded goods and house producing firms
- Final and intermediate goods
- Financial accelerator (e.g. Iacoviello 2005)
Model

Small open economy DGE model

- Traded, non-traded goods and house producing firms
- Final and intermediate goods
- Financial accelerator (e.g. Iacoviello 2005)
- Rich trade linkages calibrated to Baltic trade structure
- Financial accelerator: capture household debt and housing market linkages
- Various frictions (price, wage, capital, labour, capacity utilisation adjustment costs)
Households:

- Ricardians:
  - Utility on consumption, leisure and housing services
  - Full access to credit markets
  - Own firms - take capital investment decisions

- Collateral-constrained:
  - Same utility
  - Credit constraint: receive debt to a certain ratio of the value of their housing stock
  - ‘Impatient’: discount future more than Ricardians (would like to consume more but bound by constraint)
  - Do not own productive capital, only labour income

- ‘Trade union’: wage setting based on average utilities across households
Households:

- Ricardians:
  - Utility on consumption, leisure and housing services
  - Full access to credit markets
  - Own firms - take capital investment decisions

- Collateral-constrained:
  - Same utility
  - Credit constraint: receive debt to a certain ratio of the value of their housing stock
  - 'Impatient': discount future more than Ricardians (would like to consume more but bound by constraint)
  - Do not own productive capital, only labour income
Households:

- **Ricardians:**
  - Utility on consumption, leisure and housing services
  - Full access to credit markets
  - Own firms - take capital investment decisions

- **Collateral-constrained:**
  - Same utility
  - Credit constraint: receive debt to a certain ratio of the value of their housing stock
  - ‘Impatient’: discount future more than Ricardians (would like to consume more but bound by constraint)
  - Do not own productive capital, only labour income

- ‘Trade union’: wage setting based on average utilities across households
Firms and External country:

Firms:

- 3 sectors: Traded goods, Non-traded goods, House production
- T and NT produce both final and intermediate goods
- Monopolistic competition
- maximise profit
Firms and External country:

Firms:
- 3 sectors: Traded goods, Non-traded goods, House production
- T and NT produce both final and intermediate goods
- Monopolistic competition
- maximise profit

External sector:
- Price elastic export demand
Policy & Equilibrium conditions

Policy:
- Fiscal policy: debt rule
- Monetary policy: fixed exchange rate

Equilibrium:
- All markets clear
- Current account balance is the ‘aggregate resource constraint’ of the open economy
Simulations

- Model calibrated to Baltic States
- Used to try to understand the role of
  - TFP growth differentials
  - Fall in spreads
  - Increasing access to credit

  in explaining external deficits and other key macro variables
Calibration to Baltic States

- Traded - non-traded structures based on input-output tables
  - Import / GDP shares
Calibration to Baltic States

- Traded - non-traded structures based on input-output tables
  + import / GDP shares
- GDP components’ shares match empirical counterparts
Calibration to Baltic States

- Traded - non-traded structures based on input-output tables + import/GDP shares
- GDP components’ shares match empirical counterparts
- Elasticity of substitution between domestic and foreign goods relatively high → capture high degree of competition in export markets
Calibration to Baltic States

- Traded - non-traded structures based on input-output tables + import / GDP shares
- GDP components’ shares match empirical counterparts
- Elasticity of substitution between domestic and foreign goods relatively high → capture high degree of competition in export markets
- Remaining parameters (utility and frictions) standard in literature
Calibration to Baltic States

- Traded - non-traded structures based on input-output tables + import / GDP shares
- GDP components’ shares match empirical counterparts
- Elasticity of substitution between domestic and foreign goods relatively high → capture high degree of competition in export markets
- Remaining parameters (utility and frictions) standard in literature
- Housing:
  - Loan-to-value ratio to match initial household debt to GDP ratio
  - Elasticity of substitution between house and land low → complementary goods
TFP growth

TFP in T

TFP in NT
**TFP growth**

**Trade balance**

**pT/pNT**
TFP growth

\[ y_T \]

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure1}
\caption{TFP growth over time for different indices.}
\end{figure}

\[ y_{NT} \]

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure2}
\caption{Another view of TFP growth for different indices.}
\end{figure}
TFP growth

GDP

0.8 1.0 1.2 1.4 1.6 1.8 2.0

GFCF

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

Consumption

0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2

GFCF house

50 100 150 200 250 300 350
External Deficits in the Baltics 1995 - 2007: Catching Up or Imbalances?

TFP growth: phouse/pgdp

Julia Lendvai & Werner Roeger
European Commission, DG ECFIN
1995 - 2001: Classical 'catching-up' phase

- TFP growth allows to well track developments until the beginning of the decade:
- Drives GDP and both $Y^T$, $Y^{NT}$
- Consumption tracked until around 2001-02
- Housing investment, housing prices: some increase but not enough
- Investment increases but only very little (positive growth outlook assumption)
Fall in spreads: 100 bp from 2001

Fall in spreads

Trade balance


0.90
0.95
1.00
1.05
1.10
1.15
1.20
1.25

pT/pNT


0.90
0.95
1.00
1.05
1.10
1.15
1.20
1.25
Fall in spreads

GDP

GFCF

Consumption

GFCF house

Julia Lendvai & Werner Roeger
European Commission, DG ECFIN
External Deficits in the Baltics 1995 - 2007: Catching Up or Imbalances?
Easing access to credit

HH debt to GDP

DEBTGDPFIX
HH_DY

Julia Lendvai & Werner Roeger
European Commission, DG ECFIN
External Deficits in the Baltics 1995 - 2007: Catching Up or Imbalances?
Credit growth

Trade balance

pT/pNT

Julia Lendvai & Werner Roeger
European Commission, DG ECFIN

External Deficits in the Baltics 1995 - 2007: Catching Up or Imbalances?
Credit growth

GDP

GFCF

Consumption

GFCF house

Julia Lendvai & Werner Roeger

External Deficits in the Baltics 1995 - 2007: Catching Up or Imbalances?
Combined impact of 3 factors

Combined

Trade balance

0.0
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00

TBFIX

TBY

pT/pNT

0.90
0.95
1.00
1.05
1.10
1.15
1.20
1.25

PTNTVAYINDEX

PTNT

Julia Lendvai & Werner Roeger
European Commission, DG ECFIN
External Deficits in the Baltics 1995 - 2007: Catching Up or Imbalances?
Combined

GDP

GFCF

Consumption

GFCF house

Julia Lendvai & Werner Roeger
European Commission, DG ECFIN
External Deficits in the Baltics 1995 - 2007: Catching Up or Imbalances?
Combined

\[ y_T \]

\[ y_{NT} \]

Julia Lendvai & Werner Roeger
European Commission, DG ECFIN
External Deficits in the Baltics 1995 - 2007: Catching Up or Imbalances?
Combined: phouse/pgdp

Julia Lendvai & Werner Roeger
External Deficits in the Baltics 1995 - 2007: Catching Up or Imbalances?
Growing vulnerabilities

- Combined impact of productivity growth, decrease in the spread and easing access to credit accounts well for the evolution of most key aggregates 1995 - 2007:
  - GDP, traded and non-traded value added are well tracked over entire period
  - TFP growth implies less trade deficit (more net exports) and slower growth in domestic demand than was observed in the second half of the sample
Growing vulnerabilities cont’d:

- Increasing role of market sentiment (risk premia) and easing access to credit 2002 - 2007 - growing vulnerabilities:
  - factors do not automatically allow higher levels of production in the future, therefore new funds need to be well invested to allow for a repayment of the debt at a later stage
  - more easily reversible
Growing vulnerabilities cont’d: Role of expectations

TFP T

Trade Balance

Julia Lendvai & Werner Roeger
External Deficits in the Baltics 1995 - 2007: Catching Up or Imbalances?
Reversal scenarios: credit flow reversal

HH debt (% of GDP)

TB (% of GDP)
Reversal scenarios: expectations reversal

![TFP T graph](image)

![Trade Balance graph](image)

Julia Lendvai & Werner Roeger
European Commission, DG ECFIN
External Deficits in the Baltics 1995 - 2007: Catching Up or Imbalances?
Conclusion

- Used a Small open economy model including a housing market calibrated to Baltic States to study external deficits 1995 - 2007
- Productivity growth, decrease in spreads and increased access to credit account well for external deficits and most other key macro aggregates
TFP growth dominant in the first half of the sample, other two factors become increasingly important towards the end.

These are more reversible → indicates the vulnerability of the increasing indebtedness.

Positive growth outlook likely to have played a role.

Overall, not all that happened seems to have been out of equilibrium but increasing external indebtedness (especially in the second half of the sample) suggests a painful readjustment at the current reversal.