***Boom, Bust, Recovery: Forensics of the Latvia Crisis***

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**Online Appendix IV – A Phillips Curve Specification for Wages in the Private Sector**

In this annex we present results from estimating a Phillips curve specification for private sector wages, allowing for an effect of public sector wages on private sector wage inflation.

We use a basic wage equation for private sector wages in which wage inflation depends on conditions in the labor market and labor productivity (Blanchard and Katz, 1997). We extend the model to allow for the influence of lagged inflation in public sector wages:

where:

* is the log of average wages in the private sector (source: Latvian national statistic office, CSB);
* is the log of consumer prices (HCPI; source: Eurostat)
* is the unemployment rate (source: Eurostat)
* is the log of average wages in the public sector (source: CSB)
* is the log of cyclically adjusted labor productivity, constructed as the predicted value from a first-step regression of the log of output per occupied post in the economy (see Appendix A) on a quadratic time trend.
* denotes the first-difference operator

The model is estimated using quarterly data from 2001:1 to 2013:1 (there is no breakdown of wage data into public and private sector before 2001). All series are seasonally adjusted, either by the source or by using the Census X12 method. The series on the number of occupied posts used to construct the labor productivity series (see Appendix A) is only available since 2005:1. We used the quarterly variation of the labor force survey employment series to extend the occupied posts series back to 2001:1.

The first column of Table IV.1 shows the estimation results for average wages for the whole economy (thus excluding the variable on public sector wages). Real wages respond to conditions in the labor market as expected: the coefficient on the unemployment rate has the expected sign and is significant at the 1% significance level. Wage inflation is also responsive to deviations of real wages from labor productivity (the estimate of is positive and significant at the 10% significance level).

Columns (2) and (3) report the estimation for private sector wages, with and without inflation in public sector wages. Wage inflation in the private sector is also significantly responsive to conditions in the labor market and to deviations of real wages from labor productivity. Moreover, the coefficient on lagged public sector wage inflation is positive and significant, suggesting that private sector wages are influenced by public sector wages; including public sector wage inflation also improves the model’s fit. The model corresponding to column (4) also includes the first difference of the unemployment rate (). The coefficient is positive and significant at the 10% level, suggesting that wage inflation is not only affected by the level of the unemployment rate but also by its change. And is still positive and significant.

In order to explore whether the responsiveness of private wages to public wages may have strengthened during the period in which public sector wage cuts took place, we followed two approaches. First, we allowed for the interaction of public wage inflation with a dummy taking the value of one for 2009:1-2009:4 (roughly the period during which nominal wage cuts were imposed on public administration workers). The results, reported in columns (5) and (6), do not show significant evidence that the responsiveness of private wages to public wages was different during the period of nominal public wage cuts: The interaction term is not significantly different from zero.

The second approach was to split the sample before and after 2008:4. The results are reported in columns (7) and (8). In the second sub-period the responsiveness to the gap between wages and productivity becomes stronger but, strangely, the change in private wages does not seem to respond to the unemployment rate (the coefficient is negative but insignificant). The coefficient on public sector wages is significant in the first subsample but insignificant in the second, which would suggest that the cuts in public sector wages did not have a significant effect on private sector wages. These results, however, should be taken with caution, as there are very few observations in the second subsample (only 17). Also, splitting the sample to attempt to capture the effects of wage cuts in public sector might be problematic since the second subsample includes not only the period of public wage cuts, but also the subsequent recovery as the crisis faded.

Overall, the econometric exercise suggests that public sector wages in Latvia do influence private wages. In that sense, the cuts in public sector wages might have played a role in the fact that, as argued in the paper, productivity gains during the adjustment were not matched by equivalent wage increases. There is no significant evidence, however, that the effect of public wages on private wages was unusually strong during the period in which government wages were cut.

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**References**

Blanchard, Olivier and Lawrence F. Katz, 1997, "What We Know and Do Not Know about the Natural Rate of Unemployment," *Journal of Economic Perspectives*, vol. 11(1), pp. 51-72.

**Table IV.1 – Wage Regression**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Independent variables** | | | | | **(1)** | | | | | | **(2)** | | | | | | **(3)** | | | | | | **(4)** | | | | | **(5)** | | | | | | **(6)** | | | | | | **(7)** | | | | | | **(8)** | | | |
|  | | | | | -32.5 | | |  | | | -25.8 | | |  | | | -17.2 | | |  | | | -12.4 | | | |  | -17.7 | | | | |  | -12.8 | | |  | | | -45.8 | | | \*\*\* | | | -116.3 | | \*\*\* | |
|  | | | | | (19.77) | | |  | | | (18.88) | | |  | | | (11.84) | | |  | | | (10.51) | | | |  | (12.2) | | | | |  | (9.64) | | |  | | | (6.73) | | |  | | | (20.83) | |  | |
|  | | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |  |  | | | | |  |  | | |  | | |  | | |  | | |  | |  | |
|  | | | | | 0.33 | | | \*\*\* | | | 0.29 | | | \*\*\* | | | 0.12 | | | \* | | | 0.13 | | | | \* | 0.12 | | | | | \* | 0.15 | | | \*\* | | | 0.56 | | | \*\*\* | | | -0.15 | |  | |
|  | | | | | (0.11) | | |  | | | (0.09) | | |  | | | (0.07) | | |  | | | (0.07) | | | |  | (0.07) | | | | |  | (0.07) | | |  | | | (0.11) | | |  | | | (0.09) | |  | |
|  | | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |  |  | | | | |  |  | | |  | | |  | | |  | | |  | |  | |
|  | | | | | 9.52 | | | \* | | | 7.71 | | |  | | | 4.86 | | | \* | | | 3.72 | | | |  | 4.99 | | | | | \* | 3.85 | | | \* | | | 12.82 | | | \*\*\* | | | 28.39 | | \*\*\* | |
|  | | | | | (4.9) | | |  | | | (4.66) | | |  | | | (2.76) | | |  | | | (2.45) | | | |  | (2.85) | | | | |  | (2.25) | | |  | | | (1.82) | | |  | | | (5.14) | |  | |
|  | | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |  |  | | | | |  |  | | |  | | |  | | |  | | |  | |  | |
|  | | | | |  | | |  | | |  | | |  | | | 0.29 | | | \*\* | | | 0.25 | | | | \* | 0.30 | | | | | \* | 0.28 | | | \* | | | 0.44 | | | \*\*\* | | | 0.07 | |  | |
|  | | | | |  | | |  | | |  | | |  | | | (0.13) | | |  | | | (0.14) | | | |  | (0.16) | | | | |  | (0.16) | | |  | | | (0.08) | | |  | | | (0.06) | |  | |
|  | | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |  |  | | | | |  |  | | |  | | |  | | |  | | |  | |  | |
|  | | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |  | -0.05 | | | | |  | -0.25 | | |  | | |  | | |  | | |  | |  | |
|  | | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |  | (0.2) | | | | |  | (0.23) | | |  | | |  | | |  | | |  | |  | |
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|  | | | | |  | | |  | | |  | | |  | | |  | | |  | | | 0.30 | | | | \* |  | | | | |  | 0.46 | | | \*\* | | |  | | |  | | |  | |  | |
|  | | | | |  | | |  | | |  | | |  | | |  | | |  | | | (0.18) | | | |  |  | | | | |  | (0.21) | | |  | | |  | | |  | | |  | |  | |
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| R-squared | | | | | 0.45 | | | | | | 0.41 | | | | | | 0.54 | | | | | | 0.57 | | | | | 0.55 | | | | | | 0.58 | | | | | | 0.73 | | | | | | 0.63 | | | |
| Adjusted R-squared | | | | | 0.43 | | | | | | 0.39 | | | | | | 0.51 | | | | | | 0.53 | | | | | 0.50 | | | | | | 0.53 | | | | | | 0.69 | | | | | | 0.55 | | | |
| Obs | | | | | 48 | | | | | | 48 | | | | | | 47 | | | | | | 47 | | | | | 47 | | | | | | 47 | | | | | | 30 | | | | | | 17 | | | |
|  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | |  | | | |  |  | | | |  | | |  | | |  | | |  | | |  | |
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Note: Newey-West corrected standard errors are reported in parenthesis. The dependent variable in column (1) is overall wages; in all other columns is private wages