**Readme file to accompany ‘Envelope Wages, Hidden Production and Labor Productivity’ by A. Di Nola, G.Kocharkov and A.Vasilev**

**Structure of the folder**

The folder **DVK\_code** contains the files needed to replicate the solution and estimation of the quantitative model, together with the counterfactual experiments presented in Section 5 of the paper. The most important files are:

* main.m: this file runs the minimum distance estimation. If do\_experiments=1, it performs the counterfactual experiments.
* f\_obj.m: this function solves the model for given parameter values. It is called by main.m

It also contains the subfolder “results” with two subfolders:

* model\_fit: it stores the results of the baseline simulation (model fit, comparing model to data targets)
* experiments: it stores the results of the counterfactual experiments.

**Estimation**

* In order to replicate the minimum distance estimation, please run the matlab file main.m. To replicate the estimation starting from a suitable guess, select do\_estimation=1. We saved a good initial guess in the file guess\_from\_file1.txt in order to speed up the computation. However, if you want to start from an arbitrary initial value, set param\_from\_file=0 and input manually the guess in the cell %% SET PARAMETER VALUES.
* If you choose do\_estimation=1*,* you can also choose which estimation routine to use with the option est\_algo (our preferred routine is nlopt. If you don’t have nlopt on your computer you can set est\_algo=simulan to use a simulated annealing routine coded in Matlab that we provide in the folder).
* If instead you want to run the model at an arbitrary point x=guess, set do\_estimation=0.

**Counterfactual Experiments**

In order to replicate the counterfactual experiments (Section 5 of the paper), please set do\_estimation=0 and do\_experiments=1 in main.m. Then select the experiment that you want to perform, i.e. experiment\_num=1. The experiment results are saved in a data file for later use.

**Sensitivity Analysis**

To replicate findings in Section 5.1 (robustness check of counterfactual results to different values of gamma, as shown in Figure 14), please run results\_sensitivity.m. All results are saved in the subfolder “results\experiments”.

**Figures and Tables**

* To generate the figures and tables relative to the model fit (Figures 10-11 and Table 2), please run results\_modelfit.m. The results are stored in the subfolder “results\model\_fit”
* To generate the figures and tables relative to the counterfactual experiments (Figures 12-13 and Table 3), please run results\_experiments.m. This file loads existing results and make plots and tables. It stores them in the subfolder “results\experiments”.

**Optimal Taxation**

To replicate findings of Section 6, please see folder optimal tax and comments therein.