

The 'flow approach' to the labour market was introduced by Blanchard and Diamond (1992). This simple model consists of two dynamic equations for unemployment and vacancies. Our goal is to tackle the dynamics of the labour market from different starting points. 'Flows' are observed at numerous instances in everyday life; for example, one can consider water or other fluids flowing through pipes, electricity flowing through electric wires or other conductors, or the air flowing around a wing. The common element in all these examples is that they can be described using the Navier-Stokes equations (Batchelor, 1967). Here, we are going to adapt those equations to describe the flow of people between labour market states. This flexible framework will allow us to solve two known problems related to the currently used simple models: the stable population size and stable flow rates.

Moving to research questions, first, we would like to provide a more precise model describing the labour market phenomena. Second, our intention is to look for determinants of particular flows. The most interesting ones are those related to inactivity, particularly in the context of the Polish labour market. We will seek for factors that encourage people to move from inactivity to labour activity and those that discourage them from active participation in the labour market and hence cause movement from employment or unemployment to inactivity.

The first research task involves adaptation of the Navier-Stokes differential equation to precisely describe flows of people between different states of the labour market. This would establish the theoretical part of our research proposal.

The second research task is data harmonisation process to obtain time consistent estimates of flows and flow rates. This is not straightforward since there are several major methodological changes that affect the flow computation method.

The remaining tasks are applied in nature. The third task is to estimate or partially calibrate and then estimate the dynamic equation system. The fourth task is to find determinants of flow into inactivity. From an economic viewpoint, it is important to know which factors stimulate the decision to leave the labour market. The last, but not the least, is the fifth task: to uncover factors that stimulate flows out of inactivity. This issue is particularly important from a policy-making viewpoint.

From the modelling viewpoint, we replace the existing model of worker flows, which can be seen as the Taylor-expansion linearization of the Navier-Stokes equations, with the expanded version. In the linearized version of the model flow rates are constant. We propose to model the outflow from unemployment analogous to the problem of viscosity of the liquid. In this setting, the resulting equations could still be linearized, but the model would better reflect phenomena on the labour market. The second important element of the proposed model is that we plan to explicitly include changes in population. The number of people of working age cannot be modelled as a constant for several reasons such as longevity and migrations.

To analyse determinants of inactivity-oriented flows, we will use the Polish LFS data. Among the determinants considered are those originating from relevant literature, both microeconomic (gender, marital status, and age group) and macroeconomic (gross domestic product rate of growth and unemployment level). We plan to use standard econometric modelling techniques such as logit regressions and panel models.

Analyses of the labour market in Poland show that unemployment rates have fallen to unprecedented levels. This project aims to analyse labour market in a dynamic way and to explain movement of workers between states of employment, unemployment and inactivity. To the best of our knowledge, such a comprehensive study of the dynamic behaviour of labour market and its consequences on equilibrium unemployment in Poland has not been yet performed. The results of the project will be important not only from the academic point of view, but also will serve as a recommendation for the labour market policy. In this regard we will explore inactivity related flows.