

# Offshoring and routinization: How vulnerable are jobs in Germany?

Jobs at risk not only through computerization but also through offshoring are of big concern in current political discussions. During the last decade, task literature has attracted steadily growing interest as it has proven to be a fruitful approach for the ongoing debate. Recent developments on the American labor market, like the polarization in the 1990s, are no puzzle any more since Autor, Levy and Murnane (2003) have shown how routinization affects demand for different tasks in different ways. Instead of assessing tasks according to their routinizability Blinder (2007) presented a method to measure their offshorability. Although both Autor's and Blinder's approaches have proven to add value in explaining demand and wage changes *separately*, they haven't been used *together* so far. For the first time, a study of such kind is carried out for the German labor market. This paper aims to create measures of routinizability as well as of offshorability both of which are used then to explain wage and demand changes. As a result the dominating effect, given that there is one, can be detected.

Following the findings of Autor, Levy and Murnane (2003) it's the extent of substitutability inherent to the specific tasks that influence demand for and wages of different jobs. Technological progress has fostered the possibility to substitute manual routine tasks, frequently performed by "middle skilled" workers who can be routinized more and more easily by computer technology. Autor's studies are able to explain the relative demand and wage growth of American jobs on the lower tail of the wage distribution. (Weitere Literatur: By contrast, Dustman, Ludsteck and Schönberg (2008) show that low paid jobs in Germany could not enjoy relative wage growth within the last decades. In another study for the German labor market, Antonczyk, Fitzenberger and Leuschner (2009) conclude that a task based approach is not able to explain the still present increase of wage inequality.)

Blinder (2007) makes a slightly different approach. Although tasks play a crucial role here, too, they are not evaluated according to their substitutability but to their offshorability. On the one hand there are non-offshorable tasks that either must be delivered personally or are tied to land (e.g. agriculture), on the other hand some jobs could be offshored more easily, e.g. because they are footloose or don't need face-to-face contacts to be performed.

Although substitutability and offshorability go hand in hand frequently since both rely on an assessment of *tasks or work activities*, a task does not necessarily belong to both categories at

once. For instance, the job to make a diagnosis based on the records of a German patient might be offshorable, in the sense that Indian specialists work through the records while their German colleagues are asleep, but it is certainly not routinizable.

Tied to Blinder's thoughts of how easily different work activities could be performed by (often cheaper) workers in other countries was the will to create an offshorability index that ranks the different professions according to their vulnerability to potential offshoring. (He finds that only the 5.7 million workers in the most offshorable jobs had to suffer from a wage loss of approximately 14%.)

While Blinder (2007) stays within the usual definition of offshoring as moving jobs abroad *together with their workplace*, we expand the context. The dispatched workers in the construction sector or the foreign male and female nurses in the health sector show that national jobs are potentially put at risk through substitution of native workers by foreign nationals, no matter if the workplace stays or not within the borders of the country. If it does, one can call it on-site-offshorability (or on-the-spot-offshorability) expressing the fact that although the job stays on-site, the resulting situation for the native workers corresponds to that after offshoring. In both cases, their jobs are lost because they have been substituted by foreign nationals.

This paper aims to present routinizability as well as offshorability indices for the German labor market. At least for the first, the methods used are comprehensible and mostly objective. In using data from the Federal Institute for Vocational Education and Training (Bundesinstitut für Berufsbildung; BIBB) we get access to very detailed information on the work activities of approximately 30,000 surveyed employees. We believe that some questions in this survey (exactly: 5 of them) directly bear the information of whether or not a task can potentially be routinized by computer technology. An example would be "*How often does it occur in your job that one and the same work step is repeated in detail?*"

Although there are some professions for which the resulting answers are homogenous, we expect them to be heterogeneous in general. For instance, the percentage of routine tasks performed by a secretary may vary substantially depending on whether she works at a manufacturing company or at a research institute. Therefore we allow jobs to take different values of the indices according to the economic sector they belong to.

The resulting job/sector specific indices are then merged to the IAB employment sample in order to put the following studies on a firm footing. This paper examines whether the German employees had to pay penalties if they were in jobs that were more in danger of being offshored or routinized. In addition, we investigate if vulnerability to any of both phenomena is able to explain demand changes on the job market. Although the time of assessment is primar-

ily 2006 the information collected in former waves of the BIBB-surveys is useful to explore whether the job/sector specific indices have changed lately and if so, which jobs have experienced the most sizable changes.