Naming and shaming in a ‘fair’ way. On disentangling the influence of policy in observed outcomes*

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Abstract

Naming and shaming is a frequently applied incentive by supra-national organizations. Although common practice, a mere comparison between the outcome variable is meaningless. The observed outcome variable consists of two parts: (1) a part which is due to the general economic climate and where the policy maker does not have an influence on; (2) a ‘net’ part which is the direct result of policy interventions. This paper suggests a regression model to estimate the net policy outcome. The proposed linear panel data model accounts for short and long term economic influences, as well as time and country fixed effects. This yields an indication on the effect attributed to policy making. It is applied to early school leaving outcomes, which increasingly attract attention since recent policy actions stipulated in, e.g., the Lisbon Agenda or the No Child Left Behind Act. Despite Portugal’s best performance in the traditional naming and shaming model, once controlled for non direct policy influences, the results indicate that Luxembourg and the Netherlands can be named, while Portugal and Spain should be shamed.

Keywords: Naming and shaming; Benchmarking; Panel data model; School dropout

Jel: J23, J24, C23

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1 Introduction

As supra-national organizations often have few tools to urge member states to undertake policy reforms, they rely on peer pressure arising from cross-country comparisons (e.g. United Nations, 2003; European Commission, 2011). The peer pressure is particularly aimed for in the ‘naming and shaming’ framework, in which the best performing countries are named as benchmarks and the least performing countries are shamed as laggards. Previous literature indicated that naming and shaming is an effective incentive (e.g., for health care: Besley et al., 2009; human rights: Hafner-Burton, 2008; education: Elstad, 2009). Particularly the United Nations and the European Commission use this ‘sunshine regulatory model’ extensively in their evaluation of the policy outcomes of member states (e.g., poverty reduction, unemployment rates, educational attainments, or production volume). Within the European Union (EU) many of the general ‘Agenda’s’ determined by the European Council are monitored by ranking the performance of the countries. Simultaneously, the rankings aim to provide incentives for improving performance.

Despite its wide spread use, a mere comparison of outcome variables is nearly meaningless. Various other factors may have influenced the outcome variable of interest. If not properly accounted for, the ‘naming and shaming’ will be inaccurate and favors countries which are influenced by positive exogenous influences (e.g., economic cycle).

This paper contributes to the literature in two perspectives. First, from a theoretical point of view, a benchmarking model is suggested in which outcomes are corrected for time and country invariant effects as well as economic conditions. This contributes particularly to the productivity literature where the method can be best compared to index numbers such as Laspyres index or Tornquist index. Index numbers are convenient and heavily applied as they are non-parametric (i.e., they do not assume a priori specifications on the production frontier) and relatively easy to interpret and estimate (Fried et al., 2008). They suffer, however, from difficulties to account for heterogeneity. The suggested parametric benchmark model proceed by applying micro-econometric panel data techniques to a macro-economic setting. It is estimated by system ordinary least squares. Although the model is tailored to the application at hand (early school leaving, see below), it is not limited to this particular application. One could easily apply the benchmarking framework to other ‘naming and shaming’ applications such as deadly accidents, waste disposal or diffusion of new technologies. To facilitate its application, the Stata code is available upon request.

Second, from an empirical point of view, this paper focuses on the European Lisbon Agenda (2000): a large framework to make "the EU the most competitive region by 2010". By now, it is clear that the EU did not reach its own targets. Skeptics may blame European governments which resisted to take necessary actions. Others point to the difficult economic environment with two recessions during the last decennium.

To limit the scope, this paper considers one of the outcomes of the Lisbon agenda: early school
Back in 2000, the European Council decided to aim for a reduction by 50% of the number of students younger than 23 who leave school without a higher secondary diploma. The policy target has recently been included in the new EU economic reform package 'Europe 2020'. The emphasis on early school leaving created an ongoing shift to so-called learning outcomes in European countries. The learning outcomes are defined as "[...] statements of what a learner knows, understands and is able to do on completion of a learning process (Cedefop, 2008, p.15)". Early school-leaving is a clear indication of an incomplete learning process such that a high school diploma is not awarded. The latter is considered as a good proxy for skills supply in a population, essential for economic productivity and growth (Cedefop, 2010). Students without a high school diploma have been correlated with a higher risk on long-term unemployment (Psacharopoulos, 2007), a lower health status (Groot and Maassen van den Brink, 2007), intergenerational poverty (Bowles, 1972) or exclusion from society (Sparkes, 1999). Within the EU, governments paid a different level of attention to the issue and took different policy measures. If only policy measures influence the outcomes on early school leaving, a naming and shaming incentive might be appropriate. If other influences co-determine the school dropout level, a corrected benchmarking model is necessary.

In a recent policy document, the European Commission (2011) seems to advocate the former idea, i.e. only policy measures trigger the outcomes on early school leaving. The naming and shaming approach is clear in Figure 1 and the accompanying text "Since 2000 the average European early school leaving rate has declined by 3.2 percentage points, but progress has been insufficient to reach the 10% target by 2010 as initially agreed within the Council. In addition, the average masks large differences between Member States. Seven Member States have already achieved the 10% benchmark, while three have rates higher than 30%." (p.3). We suggest an alternative approach in which the observed 'gross' outcomes are corrected for exogenous influences. The resulting 'net' outcome aims to capture the actual contribution of policy makers in the observed outcome.

The remainder of the paper is structured as follows. Section 2 describes the empirical framework in which we estimate a macro-economic issue with micro-economic methods. A third section discusses the application which is further elaborated with data in section 3.2. Section 4 presents the results. Finally, we conclude in section 5.

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1 The term early school leaving and school dropout will be used interchangeably throughout the paper.
2 Note, however, that the scope of the application in the paper goes beyond the specific European agenda. Similar to Europe, the US aims for a high school success rate of 90% as confirmed in the 'No Child Left Behind Act' (2001). Similar targets are adopted in Canada and Australia.
3 The dropout rate is expressed here as the ratio of early school leavers in the age group 18-24 years old. An alternative, frequently used definition measures early school leavers relative to the number of people leaving education in a given year.
2 A linear panel data model

The observed outcome variable consists of two parts: (1) a part which is due to the general economic climate and where the policy maker does not have an influence on; (2) a ‘net’ part which is the direct result of policy interventions. This section outlines the methodology to reveal the net policy outcome.

2.1 Sources of endogeneity

School dropout rates are considered as an outcome variable. Considering an educational outcome variable (in casu, school dropout) purely on its own raises three issues with respect to endogeneity. First, unobserved variables at the micro level, such as student ability, might influence its outcomes. There is, however, no evidence that the abilities of students are unequally distributed across the EU-12 countries. Similarly, there is no evidence that other unobserved information such as parental education or students’ motivation influences school dropout differently across EU-12 (note that the level of parental education and motivation should not be homogeneous across countries, as long as it influences school dropout similarly).

Second, measurement error in school dropout rates can bias the results. Although reporting school dropout in the EU used to be problematic before 2000, since 2000 we can rely on Eurostat data which have a homogenous definition, are similarly collected and, as such, have a low measurement error. Moreover, for the first two reasons of endogeneity, a major advantage arises when working at the aggregate level. Griliches (1977) holds on to a net bias where unobserved ability cancels out...
measurement error. This principle has been reinforced in more recent work of Topel (1999) and Krueger and Lindahl (2001).

Third, school dropout is in an unclear and complicated way influenced by, e.g., a country’s financial inputs, industry structure and potential to innovate. For example, differences among EU-12 countries in educational quality may be a serious issue of concern. However, one may argue that the considered time span 2000-2008 is too limited to alter fundamentally the educational system driving up or down educational quality. For this reason educational quality is more or less a time and country specific constant. Using country and time fixed effects in a benchmarking model structure with school dropout rates as an outcome variable largely solves the third endogeneity problem.

2.2 A panel data benchmarking model

To rank countries’ performances on early school-leaving, a structural dropout equation model is deduced. First, outcomes are standardized using short-term and long-term economic conditions. Second, country and time invariant effects are captured in the benchmarking model. This approach is similar to a within group deviation from the mean, where the outcomes have been standardized for basic economic conditions (see: Kapteyn, 2010; and Kapteyn et al., 2007). The following subsections gradually construct the school dropout benchmarking model using panel data techniques.

Short term economic conditions

The link between early school leaving and the labor market has been extensively discussed in the literature. The youth labor market appears to be highly sensitive to market conditions, in turn causing youth employment problems (Müller and Gangl, 2003 among others). An early study from Reich and Young (1975) already identified 53% of all dropout cases in their sample as work-oriented. Müller and Gangl (2003) have shown that the rising knowledge society goes along with the increasing necessity of high-skilled labor during the early 1990’s. Consequently, job market wages increased. This has a dual impact on education. On the one hand, the returns to education increased such that the average years of schooling increased. On the other hand, as also low end wages increased, the opportunity cost of schooling increased as well. The higher the labor market wage, the higher the (short term) benefit for leaving school before a high school diploma is obtained.

To test the direction of the correlation, consider a simple regression model in which we relate early school leaving to the labor market opportunities:

\[ y_{jt} = \phi_{jt} w_{jt} + \text{error}_{jt}, \]

where \( y_{jt} \) denotes the dropout rate of country \( j \) \(( \in 1, 2, \ldots, J \) \) at time period \( t \) \(( \in 1, 2, \ldots, T \) \), \( w_{jt} \) indicates the hourly labor costs, and \( \text{error}_{jt} \) a country and time specific error term. The variables are expressed in their natural logarithm to estimate the proportional impact. The hourly labor cost, \( w_{jt} \),
consists of two components: (1) wages and salaries and (2) other benefits. To make sure that \( w_{jt} \) is not correlated with \( \text{error}_{jt} \) at time \((t = 1, 2, \ldots, T)\) across the j-index, \( w_{jt} \) is expressed by its wage rate. To do so, we take the first differences of the natural logarithm of hourly wages \((w_{r,jt})\). The intertemporal change in wage captures information on job market conditions and is, moreover, uncorrelated with the error term across the j-index.\(^4\) The wage rate is expressed as:

\[
 w_{r,jt} = w_{j(t-1)} - w_{jt}. \tag{2}
\]

Plugging (2) into (1) results in:

\[
 y_{jt} = \beta_{j} w_{r,jt} + \text{error}_{jt}. \tag{3}
\]

From equation (3) is is clear why we cannot rely on simple ordinary least square estimation (OLS). The OLS assumption of strict exogeneity implies that the error terms \((\text{error}_{jt})\) are at any time period \(t\) uncorrelated with past, present and future values of the wage rate \(w_{r,jt}\). This strict assumption is relaxed in system OLS, which relies on contemporaneous exogeneity. In contrast to cross-sectional OLS, system OLS does not require \(w_{r,jt}\) to be uncorrelated with \(\text{error}_{jt}\) at all time periods in panel data contexts. In system OLS it suffices that \(w_{r,jt}\) is uncorrelated with \(\text{error}_{jt}\) at time \((t = 1, 2, \ldots, T)\) across the j-index (note that \(w_{r,jt}\) is differently composed than in OLS; Wooldridge, 2010).

Estimating equation (3) does not suffice as it captures only short term economic conditions. The next subsection extends this by adding long term economic conditions.

**Long term economic conditions**

To standardize for long term economic growth, we use economic development as a proxy. In particular, we include a country’s growth in per capita GDP as an indicator for a country’s industry structure, demand for low-skilled labor, and the potential to innovate.\(^5\) An extensive literature analyses thoroughly the role of education in explaining the GDP growth rate (e.g., Solow, 1957; Nelson and Phelps, 1966; Asteriou and Agiomirgianakis, 2001). Topel (1999) suggests a positive association between economic development on the one hand and the level and change of education on the other hand. Rumberger and Lamb (2003) are even more specific and indicate that the overall level of the economy influences the level of early school leaving. Krueger and Lindahl (2001, p.1111) confirm and argue that "[...]/ countries below their steady-state income level should grow quickly, and those that are above it should grow slowly". Irrespective of the direction of the association between education and growth, i.e. causality, Krueger and Lindahl (Ibidem) indicate that a country with a rather high economic growth rate performs better with respect to the change of educational attainment of its population than a country with

\(^4\)Note that we do not observe a significant correlation between the differences in the log wages and salaries and early school-leaving.

\(^5\)Underlying analysis indicates that changes in per capita GDP are uncorrelated with the error terms.
a rather low economic growth rate. The positive correlation between economic growth and education has also been indicated at various other places in the literature (see, e.g., Barro, 1991; Hanushek and Woessmann, 2010; Krueger and Lindahl, 1998; among others).

Similar to the short term influences, taking the first difference in GDP avoids any correlation between $GDP_{jt}$ and $error_{jt}$. Although we observe a correlation between the wage rate $w_{r,jt}$ and the growth rate $GDP_{r,jt}$ of 0.8617 (significant at 1%-level), the two variables are complementary and focus on a different time horizon. In general, an increasing wage rate correlates positively and significantly with increasing dropout levels. If wages increase, the opportunity cost of staying in school increases such that (probably) less motivated students change school for a job. On the other hand, an increase in GDP decreases the level of dropouts (see for example, Martin and Rogers, 2000). Short term changes are reflected by the wage rate; long term changes are captured in the growth rate. This results in:

$$y_{jt} = \beta_{jt} w_{r,jt} + \theta_{jt} GDP_{r,jt} + error_{jt}.$$  \hspace{1cm} (4)

Although equation (4) estimates the correlation of $w_r$ and $GDP_r$ on early school leaving, and although it does not allow for a causal interpretation an se, we can make a strong case for the direction of the correlation. It is indeed very unlikely that, on aggregate (and in Western countries), school dropout influences the wage rate or the change in GDP. The more it is likely that the correlation runs from the wage and growth rate towards school dropout. Although this non-experimental setting does not allow for a strict causal interpretation, we can argue in the empirical section below that changes in wage and GDP cause early school leaving.

**Country and time invariant effects**

Using only EU-12 countries among the 27 EU member states is well-considered. EU-12 countries are a rather homogenous group with respect to law and order and economic characteristics (see also: Soukiazis and Castro, 2005). Moreover, economic swings do not (or only to a very limited extend) induce movement of secondary education students across borders (for more information on the relevance of considering student mobility across borders, see: Christou and Haliassos, 2006). Indeed, inter-job market mobility of 15 to 25 years old working in EU-12 countries is low (Eurostat). Therefore, economic up or down turns in one member state will not affect the dropout decision of students in a neighboring member state. Nevertheless, there arise three issues.

First, the interaction between the labor market and the education sector might differ across the analyzed countries. The benchmarking model in Equation (4) assumes that the link between the labor market and school dropout is similar for all countries. This is not necessarily true in reality. Second and as indicated above, the organization of education differs across countries. Third, the effectiveness of policy relies on unobserved factors as country-specific institutional factors or time trends across all countries.\(^6\) Panel data techniques and balanced data make it possible to control for similar country and

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\(^6\)We remark that time trends, e.g. sensitization of youngsters to obtain a school-leaving certificate, may differ from
Equation (4) is extended by time dummies ($\delta_1, \ldots, \delta_T$) and country dummies ($\xi_1, \ldots, \xi_J$) capturing time and country fixed effects.\footnote{Fixed effects are preferred over random effects as we are interested in the individual means across the country levels (and not the variance of means as in the random effects model).}

**A standardized dropout rate**

After standardization of the school dropout rate, a country - but not time - specific constant $\psi_j$ is captured in equation (5), where $\psi_j$ is denoted by the conditional average dropout rate. It can be argued that this constant $\psi_j$ is closely related to a country’s educational policymaking. The observed gradual decline in early school leaving across all countries (arising, e.g., from technological change and the increasing demand for high skilled youth) is removed from $\psi_j$ by a within group estimated procedure (see: subsection 2.3). In this sense, $\psi_j$ captures the average dropout rate conditional on economic conditions and time and country invariant effects and therefore differs to some extent from the unconditional average dropout rate $y_{jt}$.

Note that this approach is similar to Kapteyn (2010), and Kapteyn et al. (2007). The latter two authors use within country panel analysis to deal with international comparison of health outcomes.

In sum, we estimate the following equation:

$$y_{jt} = \psi_j + \beta_{jt} w_{r,jt} + \theta_{jt} GDP_{r,jt} + \sum_{t=1}^{T} \alpha_t \delta_t + \sum_{j=1}^{J} \gamma_j \xi_j + error_{jt}. \tag{5}$$

### 2.3 Estimation procedure

Equation (5) is estimated by system OLS using fixed coefficient models that vary over different cross-sectional units. The regression coefficients are time invariant but vary from one unit to another (see also Hsiao, 2003). Thus, we estimate $J$ equations, a so-called system, and apply least squares separately to the time-series observations of each cross-sectional unit. Fixed coefficient models are preferred as the labor market data comes from a heterogenous population (i.e., respondents from different countries).

As system OLS estimates each equation separately, $\left( \sum_{t=1}^{T} \alpha_t \delta_t + \sum_{j=1}^{J} \gamma_j \xi_j \right)$ is left out of the regression for obvious reasons of multicollinearity.\footnote{Multicollinearity exists as (1) time effects are captured through differencing wages and per capita GDP and (2) country effects are captured by estimation of each equation separately.}

Therefore, the following is estimated:

$$y_{jt} = \psi_j + \beta_{jt} w_{r,jt} + \theta_{jt} GDP_{r,jt} + error_{jt}. \tag{6}$$

In a ‘naming and shaming’ framework, outcomes of the first period (before the policy intervention) are compared to the outcomes in the last period (during or after the policy intervention). Comparing $y_{jt(t=T)}$ to $y_{jt(t=1)}$ in a ‘naming and shaming’ framework can only be insightful if and only if only policy influences the average school dropout rate ($y_j$). Following our central argument, a more reliable
benchmarking model can be obtained by comparing the change in the school dropout rate between the end period $T$ and the initial period $1$ with a conditional or ‘net’ outcome $\hat{\psi}_j$. The net outcome $\hat{\psi}_j$ is the estimated value of $\psi_j$ in equation (5) and captures the average school dropout rate by country standardized for basic, however, good (measurable and available) approximates for economic conditions ($w_{r,jt}$) and ($GDP_{r,jt}$) and controlled for country and time invariant effects. The gross (observed) change in the outcome variable may then be decomposed into two components:

$$= E[\Delta y|\Delta w_r, \Delta GDP_r, \delta, \xi] + E[\Delta y_{policy}]$$

(7)

The first component denotes the change in outcome variable due to influences beyond the control of the educational policymaker. This change is denoted by the expected value of the change in dropout rate conditional on the change in wage rate ($\Delta w_r$), the change in economic development ($\Delta GDP_r$), country and time fixed effects. The second component captures the net change in the outcome variable school dropout. Based on these two components, it is possible to rank countries’ absolute performances with respect to early school-leaving of all observations ($j = 1, 2, ..., J$).

3 Application on early school-leaving

3.1 Theoretical background

As one of the key drivers of prosperity, education attracted a significant attention in both the policy debate and the academic literature (e.g., Lisbon Agenda; No Child Left Behind Act; Hanushek and Woessmann, 2010). This section focuses on one educational outcome in particular: early school leaving.

At the micro-level, school dropout is triggered by students’ individual and family background characteristics. Important predictors of early school-leaving among individual factors are exam success (Dustmann and van Soest, 2007) or test scores (Dalton et al., 2009), retention in grade (Planc et al., 2005) and secondary school employment (Allensworth, 2005). Literature indicated that students have higher dropout risks when facing a low motivation (Adams and Becker, 1990), low abilities (cf. a rather low academic achievement) or low socioeconomic status (for example, Swadener, 1995; Herbert and Reis, 1999). In addition to these factors, gender and ethnicity (Dalton et al., 2009), and psychological or behavioral problems (Ekstrom et al., 1986) go along with a higher probability on non-graduation. School and neighborhood characteristics, such as low inspiring teachers, school career, large class sizes, or living in a disadvantaged neighborhood, influence negatively the student’s dropout decision (Rumberger, 2004).

At the macro-level, it is clear that policy makers have to tackle simultaneously various factors which might influence school dropout. While often the case, not always the ministry of education can influence the dropout determinants. For example, disadvantageous neighborhoods should be approached by the

\[\text{Note that in equation (7), time fixed effects are captured by taking the first differences of the outcome variable (\(\Delta y_{jt}\)), whereas country fixed effects are captured by estimating each equation separately in system OLS.}\]
ministry of internal affairs, not of education. Therefore, to reduce early school leaving, policy makers should cooperate across departments and ministries. Individual policy measures, focussing on one of the micro-level determinants are often observed as non-effective or insignificant. Taking into account a publication bias (i.e., only studies with significant outcomes are published), we find some illustrative evidence in De Witte and Cabus (2010), Cabus and De Witte (2010) and De Witte and Csillag (2010). Each of these studies finds only limited impact of individual policy measures on school dropout. Given the complexity of the problem, this is not surprising. By evaluating the effectiveness of the policy at macro-level, we do not evaluate individual policy measures on their own, but the general outcomes across all policy measures.

Consider the average dropout rates for 12 EU countries over the period 1992-2009. An overall decline in dropout rates is observed: from 32.27% in 1992 to 14.41% in 2009. Remarkably, since the European Council in 2000, EU-12 countries’ performances are rather low compared with the pre-period 1992-2000. Before the implementation of the Lisbon Strategy, average dropout rates reduced by 14.67 percentage points. Since 2000, we observe only a reduction of 2.87 percentage points. Several reasons might explain this discrepancy.

First, dropout rates might already be situated at a minimum level. Following the argument, in the early nineties, it was relatively easy to convince students to stay at school. Since 2000, the more problematic students are not that easy to convince such that there is few scope for further reduction in dropout level. A ‘natural dropout rate’ emerges (for further intuition, see: Rumberger, 2011, p.55). This, however, does not fully explain the large observed differences in the level of dropout rates between European countries. Comparing Sweden or Denmark with, e.g., Portugal or Spain shows that the average dropout rate significantly differs by country. If early school-leaving depends on country-specific factors such as institutions or policymaking, the existence of a ‘natural dropout rate’ is less likely, or is at least significantly lower than 15% of the age group of 18-24 years old.

Second, the policy measures taken by the different EU member states did not have any effect, or even a negative effect. Although individual policy measures might have little or insignificant effects, it seems very unlikely that the increased attention to early school leaving would not result in a decrease of dropout rates. More likely and similar to our central argument, the policy measures can interact with the labor market or other economic policy.

Finally and most likely, the definition of early school leaving used to differ across EU countries. While before 2000 definitions were heterogeneous, after 2000 the definition was harmonized to monitor the outcomes. We encounter this problem using data of 12 EU countries from the European Statistical Agency (Eurostat). Moreover, we limit the scope to the 2000-2008 period and, in estimating the benchmarking model systematic errors in reporting are captured in the country specific fixed effect.
Table 1: Dropout rates of EU-12 countries: ranking the observed average dropout rate over the period 2000-2008

<table>
<thead>
<tr>
<th>country</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
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<th>2007</th>
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<tbody>
<tr>
<td>Finland</td>
<td>9.0</td>
<td>9.5</td>
<td>9.7</td>
<td>10.1</td>
<td>10.0</td>
<td>10.3</td>
<td>9.7</td>
<td>9.1</td>
<td>9.8</td>
<td>9.7</td>
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<tr>
<td>Austria</td>
<td>10.2</td>
<td>10.2</td>
<td>9.5</td>
<td>9.0</td>
<td>9.5</td>
<td>9.1</td>
<td>9.8</td>
<td>10.7</td>
<td>10.1</td>
<td>9.8</td>
</tr>
<tr>
<td>Denmark</td>
<td>11.7</td>
<td>9.2</td>
<td>9.0</td>
<td>10.4</td>
<td>8.8</td>
<td>8.7</td>
<td>9.1</td>
<td>12.5</td>
<td>11.5</td>
<td>10.1</td>
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<td>10.0</td>
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<td>9.2</td>
<td>10.8</td>
<td>13.0</td>
<td>12.2</td>
<td>12.2</td>
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<tr>
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<td>13.4</td>
<td>13.2</td>
<td>12.8</td>
<td>12.2</td>
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<td>12.6</td>
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<td>12.3</td>
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<td>14.1</td>
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<td>12.9</td>
<td>12.6</td>
<td>12.1</td>
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<td>15.3</td>
<td>14.3</td>
<td>14.1</td>
<td>13.5</td>
<td>12.6</td>
<td>11.7</td>
<td>11.4</td>
<td>13.7</td>
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<td>12.7</td>
<td>13.3</td>
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<td>13.4</td>
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<td>12.1</td>
<td>12.1</td>
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<td>17.0</td>
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<td>30.7</td>
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<td>38.8</td>
<td>39.1</td>
<td>36.9</td>
<td>35.4</td>
<td>40.4</td>
</tr>
</tbody>
</table>

̄y denotes the average observed dropout rate in EU-12 countries (i.e. EU-12 countries leaving Greece, Ireland, and Italy aside) over the time period 2000-2008. This average is ranked from smallest to largest (as it is often used in a naming and shaming framework).

3.2 Data

Similar to the European commission in its ‘naming and shaming’ framework, we use data provided by the European Statistical Agency (Eurostat). This data on early school leaving is extended by labor market data from the EU Labour Force Survey (LFS), a large survey among private households. It covers 1.5 million people every quarter of the year and is considered as one of the most important data sources for conditions and trends in the EU labor market.

The data at hand have some limitations. First, survey participants may answer a question differently across countries or answers may be highly correlated with the current economic conditions (Kapteyn et al., 2007). By using system OLS, we avoid this limitation. Second, as argued above, the definition of early school leaving used to differ across EU countries. We account for this by using data on the period 2000-2008 in which there was agreement on a uniform definition. Third, similar to other macro-economic studies, one may argue that the number of data points are limited (i.e., 12*9). Nevertheless, both other macro-economic studies and policy makers use a similar amount of data.

To provide some additional insights in the underlying data, Table 1 presents the yearly dropout rates for each of the 12 countries over the period 2000-2008. The last column in this table presents the average dropout rate 2000-2008. Following the naming and shaming idea, we use the average to rank countries’ performances from smallest to largest. For most countries, we observe a decline in the dropout rates of the analyzed countries. Portugal and the Netherlands are the best performers in absolute values with a decrease of, respectively, -8.2 and -4.0 percentage points. Also Luxembourg (-3.4 percentage points), Germany (-2.8), Belgium (-1.8), France (-1.4), the United Kingdom (-1.2), Denmark (-0.2), and Austria (-0.1) experienced a decreasing level of early school leavers. Remarkably, in three countries an increase in dropout rate has been observed between 2000 and 2008. The latter are Sweden (+4.9 percentage points), Spain (+2.8) and Finland (+0.8).
Table 2: Economic indicators: the average wage rate, economic development and unemployment among 15-25 years old over the period 2000-08

<table>
<thead>
<tr>
<th>Country</th>
<th>Wage rate</th>
<th>Economic development</th>
<th>Unemployment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>1.89%</td>
<td>3.51%</td>
<td>0.29%</td>
</tr>
<tr>
<td>Belgium</td>
<td>3.10%</td>
<td>3.59%</td>
<td>-0.33%</td>
</tr>
<tr>
<td>Denmark</td>
<td>3.09%</td>
<td>3.61%</td>
<td>-0.17%</td>
</tr>
<tr>
<td>Finland</td>
<td>3.91%</td>
<td>4.27%</td>
<td>-0.54%</td>
</tr>
<tr>
<td>France</td>
<td>3.61%</td>
<td>3.25%</td>
<td>-0.42%</td>
</tr>
<tr>
<td>Germany</td>
<td>1.85%</td>
<td>2.32%</td>
<td>0.20%</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>4.57%</td>
<td>6.27%</td>
<td>1.16%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>4.05%</td>
<td>4.41%</td>
<td>-0.08%</td>
</tr>
<tr>
<td>Portugal</td>
<td>4.06%</td>
<td>3.71%</td>
<td>0.84%</td>
</tr>
<tr>
<td>Spain</td>
<td>1.57%</td>
<td>5.55%</td>
<td>-0.30%</td>
</tr>
<tr>
<td>Sweden</td>
<td>3.06%</td>
<td>3.03%</td>
<td>0.86%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2.71%</td>
<td>2.33%</td>
<td>0.26%</td>
</tr>
</tbody>
</table>

The wage rate $w_{r,jt}$

The wage rate $w_{r,jt}$ captures the short term push factors arising from labor market conditions and opportunities. It is measured from the hourly wage costs, and in particular its component 'wages and salaries', which includes compensation in cash and kind and workers’ social security contributions. The data are also available from Eurostat. From the wage cost ($w_{jt}$), the wage rate ($w_{r,jt}$) is computed. In general, when a sufficient number of time periods are included, job market conditions are considered as stationary within each country. They fluctuate above and below a given expected value of the wage rate (Wooldridge, 2010). Table 5 in Appendix indicates for the 12 EU countries a bound between -1 and 1 percentage while the wage rate has a mean stationary approximately equal to zero. In other words, although the wage rate may be situated above or below zero over time, its expected value is approximately equal to zero.

Economic development $GDP_{r,jt}$

A second component standardizing a country’s average dropout rate in equation (5) consists of economic development. As a proxy, we use the first difference in the natural logarithm per capita GDP at market prices ($GDP_{r,jt}$) (current prices, euro per inhabitant). We observe a strong negative association between economic development ($GDP_{r,jt}$) and early school-leaving of -0.6896 (significant at 1%-level). The negative sign suggests that a flourishing economy reduces early school leaving. Although the correlation might also run the other way around (i.e., school dropout hampers economic development), the small proportion of early school leavers in total population makes this assumption unlikely: more graduating early school leavers cannot influence the yearly change in economic development (see also: Asteriou and Agiomirgianakis, 2001).

In the data we observe an economic revival between 2003 and 2007. Correspondingly, we observe accelerating economic growth for the EU-12 countries between 2003-07 (see Table 6 in Appendix). The first signs of the financial crisis caused a slowdown or even decline in economic growth in 2008. In
particular for the United Kingdom and Sweden the start of an economic recession was most pronounced in the data.

4 Results

4.1 Ranking cross-country differences in performances

Equation (5) is estimated using system OLS. As such, the change in dropout level is decomposed in (1) a component due to the economic conditions, country and time invariant effects, and (2) the net result thanks to policy interventions. The results are presented in Table 3. The estimated \( \hat{\psi}_j \) in column (4) represents the average dropout rate conditional on short term \( (w_{r,jt}) \) and long term \( (GDP_{r,jt}) \) economic conditions, as well as country and time fixed effects. Comparing \( \psi_j \) to the initial dropout rate reveals to which extent economic conditions influenced the dropout rate of a country. The 'corrected' naming and shaming results are presented in the third column of Table 3 and in Figure 2. The results reveal that, e.g., in the Netherlands, the dropout rate decreased between 2000 and 2008 by 4 percentage points. Out of this 4 percentage points, -2.81 percentage points can be attributed to economic growth and a positive but declining wage rate. Besides the Netherlands, Portugal and Denmark have benefitted the most from economic influences. On the contrary, economic influences were pushing dropout rates up for Sweden and Finland while, in fact, their job market conditions and economic development do not statistically differ from other EU-12 countries.

In particular, we are interested in the decline of the dropout rate that cannot be explained by economic conditions or country and time fixed effects. In Column (6) of Table 3, \( \Delta y_{policy} \) captures the effectiveness of educational policymaking. In the example of the Netherlands, the unexplained part of -1.19 percentage points reflects the active government involvement on early school leaving. We observe that Portugal (+12.91 percentage points), Spain (+5.02), Denmark (+2.90) and Sweden (+1.65) performed poorly. In contrast, Finland (-0.62) succeeded in reducing the dropout rate despite its negative economic conditions. Austria (+0.00), the United Kingdom (+0.09) and France (+0.73) did not succeed in changing the dropout rate significantly thanks to policy interventions. Among the 12 countries, Luxembourg (-2.40) was the best performer over the last decade (a relative decrease of 14.29% in comparison to 2000). However, one may indicate the relative small size of Luxembourg and consider its performance as an outlier. The Netherlands (-1.19 in absolute; 7.72% relative to 2000) follows in second position, before Belgium (-0.87; 6.30%) and Germany (-0.68; 4.65%).

Given the above observations, it is interesting to explain cross-country differences in performances. This is discussed in the next subsection 4.2.

4.2 Explaining the net policy influence

Students with the highest risk of dropping out are vocational pupils (e.g., Rumberger, 1987; De Witte and Cabus, 2011). In explaining why some countries have better policy results than others, a natural
Table 3: Absolute performances (percentage points)

| Country       | 2000 (%) | 2008 (%) | $\psi_{2000} - \psi_{2008}$ (%) | $\psi_j$ (%) | $E|\Delta \psi|/\Delta \psi_{r, \Delta GDP, \delta, \xi}$ (%) | $\Delta \psi_{policy}$ (%) |
|---------------|----------|----------|-------------------------------|-------------|-------------------------------------------------|--------------------------|
| Luxembourg    | 16.80    | 13.40    | -3.40                         | 15.80       | -1.00                                           | -2.40                    |
| Netherlands   | 15.40    | 11.40    | -4.00                         | 12.59       | -2.81                                           | -1.19                    |
| Belgium       | 13.80    | 12.00    | -1.80                         | 12.87       | -0.93                                           | -0.87                    |
| Germany       | 14.60    | 11.80    | -2.80                         | 12.48       | -2.12                                           | -0.68                    |
| Finland       | 9.00     | 9.80     | 0.80                          | 10.42       | 1.42                                            | 0.62                     |
| Austria       | 10.20    | 10.10    | -0.10                         | 10.10       | -0.10                                           | 0.00                     |
| United Kingdom| 18.20    | 17.00    | -1.20                         | 16.91       | -1.29                                           | 0.09                     |
| France        | 13.30    | 11.90    | -1.40                         | 11.17       | -2.13                                           | 0.73                     |
| Sweden        | 7.30     | 12.20    | 4.90                          | 10.55       | 3.25                                            | 1.65                     |
| Denmark       | 11.70    | 11.50    | -0.20                         | 8.60        | -3.10                                           | 2.90                     |
| Spain         | 29.10    | 31.90    | 2.80                          | 26.88       | -2.22                                           | 5.02                     |
| Portugal      | 43.60    | 35.40    | -8.20                         | 22.49       | -21.11                                          | 12.91                    |

Column (1) and column (2) presents a country’s dropout rate in 2000, respectively, 2008. Column (3) shows the total decline in dropout between 2000 and 2008. Column (4) reveals the average dropout rate conditional on economic influences. Column (5) presents the change in the dropout rate thanks to economic influences. Column (6) shows the change in dropout which is unexplained by the benchmarking model.

Figure 2: Naming and shaming based on policy influences
starting point are enrollment trends in vocational tracks. As such, enrollment in VET and its organization may influence the effectiveness of policy. Additional insights in the organization of schooling markets and accents on vocational education and training of the selected EU-12 countries are provided in the next paragraphs. Thereafter, the estimated ‘net’ policy outcomes are associated with observed enrollment and organizational trends among these EU-12 countries.

Although enrollment in and organization of VET is a natural starting point in explaining the ‘net’ policy influence, also the quality of education is. It can be expected that the quality of educational resources positively correlates with the effectiveness of policy measures. The higher the educational quality, the higher the discretionary influence of policy. In the last subsection, associations between the estimated ‘net’ policy outcomes and educational quality measures are provided, such as quality of educational resources and quality of human resources. Remark that potential associations have been investigated carefully, such as other associations between the ‘net’ policy outcome and population growth or immigration rates (see also: Rosenzweig, 1988; Srinivasan, 1988), youth unemployment rates, expenditure on upper secondary education and educational expenditure as a percentage share of GDP (see also: Jung and Thorbecke, 2003), and the student-teacher ratio. However, we do not find a significant relationship between these listed determinants and the estimated policy variable. The results are therefore left out of this paper.

Organization of schooling markets

Before turning to the association between the estimated policy outcome and several explanatory variables, we start with a paper of Gangl (2002) who classified schooling markets into different categories. Countries are positioned among each other according to their level of stratification (internal labor market) or standardization (occupational labor market). Stratification deals with the extent and form of tracking at secondary education. Stratification is relatively high in the Netherlands, Belgium and Germany where early ability tracking takes place to enter secondary education. Within these countries, vocational tracks are well organized within the scope of internships or so-called dual tracks. As a result, the labor market is closely connected with the schooling market. During the school career, however, there is little inter-track mobility possible. Once entered, it is difficult to ‘escape’ the assigned school track. Other examples of occupational labor market systems are Austria and Denmark.

More inter-track mobility is observed in standardized educational systems, where tracking occurs at a later age in the school career. Consequently, students obtain a school-leaving certificate that has the same quality (or signal for employers) nationwide. Among EU-12 countries, we find a comparable level of standardization in France and Belgium. In the latter countries, it is possible to follow either a general school track which results in a school-leaving certificate providing access to post-secondary education institutions, or to follow a vocational school track.

In contrast, the educational system in Ireland is much looser organized. Nevertheless, the student’s cognitive knowledge is of high importance for successful labor market entrance. Applicants are liable to standardized examinations organized by employers. The results on those tests determine strongly
Table 4: Explaining the net policy influences by enrollment of boys in VET, quality of educational resources (PISA 2006 index) and quality of human resources (PISA 2006 index)

<table>
<thead>
<tr>
<th>Country</th>
<th>Enrollment boys VET</th>
<th>Evolution boys VET</th>
<th>Quality educational resources</th>
<th>Quality human resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>79.4</td>
<td>0.92%</td>
<td>0.36</td>
<td>-0.36</td>
</tr>
<tr>
<td>Belgium</td>
<td>71.0</td>
<td>0.77%</td>
<td>-0.03</td>
<td>0.49</td>
</tr>
<tr>
<td>Denmark</td>
<td>57.1</td>
<td>-0.67%</td>
<td>-0.09</td>
<td>0.1</td>
</tr>
<tr>
<td>Finland</td>
<td>65.2</td>
<td>2.26%</td>
<td>-0.23</td>
<td>-0.28</td>
</tr>
<tr>
<td>France</td>
<td>57.9</td>
<td>-2.33%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Germany</td>
<td>66.3</td>
<td>-1.02%</td>
<td>0.11</td>
<td>0.36</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>66.7</td>
<td>-0.21%</td>
<td>0.26</td>
<td>1.06</td>
</tr>
<tr>
<td>Netherlands</td>
<td>70.6</td>
<td>-0.23%</td>
<td>0.26</td>
<td>0.13</td>
</tr>
<tr>
<td>Portugal</td>
<td>29.2</td>
<td>43.75%</td>
<td>-0.38</td>
<td>-0.84</td>
</tr>
<tr>
<td>Spain</td>
<td>42.0</td>
<td>4.52%</td>
<td>-0.02</td>
<td>-0.64</td>
</tr>
<tr>
<td>Sweden</td>
<td>55.1</td>
<td>2.80%</td>
<td>0.05</td>
<td>-0.36</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>56.7</td>
<td>-6.27%</td>
<td>0.27</td>
<td>0.08</td>
</tr>
</tbody>
</table>

The highest interaction between the school and the labor market is found in Italy, Greece, Spain, and Portugal where there is a significant on-the-job training of youngsters. Although school-leaving certificates are important, socioeconomic background plays a crucial role in the recruitment process.

In Nordic countries, a major role is subscribed to the state. In a similar institutional environment, educational systems are financially subsidized and politically organized. Employers use standardized qualifications during the recruitment process and the school-to-work transition is considered as an important task of the unions.

The link between vocational education and school dropout

Front runners of an overall high participation rate of boys in vocational education and training (VET) are observed in Austria (79.4%), Belgium (71.0%), the Netherlands (70.6%), Luxembourg (66.7%), Germany (66.3), and Finland (65.2%). Over the period 2000 to 2008, the share of students enrolled in upper secondary education VET programs increased considerably in Spain (+4.52%), Portugal (+43.8%), Finland (+2.26%) and Sweden (+2.80%). Although only suggestive evidence is available, these countries seemed to have failed in managing the increasing enrollment rates in VET. Table 3 and Figure 3 (Appendices) present the negative relationship between boy’s enrollment in VET and early school leaving. Enrollment in VET can explain 79% of the variation in early school leaving across countries.

Concerning the link between pre-vocational and vocational education, Belgium and the Netherlands have pre-vocational and vocational education programs at lower secondary level. In other countries, these tracks have very low enrollment rates or are non-existing (Ostenk and Blokhuis, 2007). A smooth transition between pre-vocational and vocational education seems to favor the scope for policy interventions. Also countries with larger possibilities for a smooth school-to-work transition have
a larger scope for effective policy (OECD, 2006; Quintini et al., 2007). We observe, e.g., a well-developed apprenticeship system in Germany and Austria. On the contrary, Portugal lacks “pronounced occupational structures of youth labor market integration” (Gangl, 2002). In line with Gangl (Ibidem), the results indicate that Portugal fails to manage the increasing (+43.75%) enrollment rate of boys in VET over the period 2000 to 2008: as much as +12.91 percentage points is attributed to ($\Delta y_{\text{policy}}$).

Next to Portugal, we observe highest increase in enrollment rate of boys in VET in Spain with +4.52% over the period 2000 to 2008. In Spain the transition from school-to-work is hard. It takes about 6 years to find a permanent job due to a high degree of labor market segmentation between temporary and permanent jobs (Quintini, Martin and Martin, 2007). As a result the share of students neither in education nor in employment is relatively high in Spain, where we attributed +5.02 percentage points to ($\Delta y_{\text{policy}}$). Thus, young unemployment spells are common in Spain and is in high contrast with Germany and Austria, where largest share of youngsters find a job without experiencing any unemployment (Ibidem).

The observed close link between our outcomes on policy effectiveness and VET contradict earlier assumptions of OECD (1999) in that occupational systems lack the capacity to adapt to structural change. Netherlands and Germany, for example, experienced a positive impact of short term and long term influences on early school-leaving. Both countries, however, perform well in terms of fewer school dropouts and have a well-organized interaction between the labor market and vocational education. One can argue that this part of dropout reduction attributed to ($\Delta y_{\text{policy}}$) is more durable than the part subscribed to economic swings.

**The link between educational quality and school dropout**

Educational quality on its own can explain 47% of the variation in the ‘net’ policy estimate. If one excludes the countries Austria, Finland and the United Kingdom from Figure 4 (Appendices), the link between educational quality and school dropout increases to 81%. This is observed in Figure 4. In a similar vein, we can expect that the quality of teachers and school management positively correlates with potential policy impact. This is graphically presented in Figure 5 (Appendices) where quality of human resources explains 53% of the variation in the ‘net’ policy outcomes. Excluding Austria, Finland and Sweden from Figure 5, the explanatory value increases to 76%. Figure 4 and Figure 5 may indicate, for example, that better employees are more able to translate policy interventions in practice. In developing an effective policy, it seems worthwhile to invest in the quality of educational and human resources.

5 Conclusion and policy guidance

Naming and shaming of policy makers based on observed outcomes leads to biased results as also noncontrollable factors influence these outcomes. This paper suggests a simple linear benchmarking model which estimates a country’s average dropout rate conditional on short term and long term
economic conditions, country and time invariant effects. From the conditional average dropout rate, a ‘net’ policy outcome may be obtained. The results are then used for a reliable and meaningful ‘naming and shaming’ framework, where the estimated policy outcome may be associated with several explanatory variables.

The model is applied to early school leaving outcomes in EU-12, which draws increasing attention since the Lisbon Agenda (2000) and the No Child Left Behind Act (2001). Without controlling for exogenous influences, Portugal and the Netherlands are the best performers in absolute values with a decrease of, respectively, -8.2 and -4.0 percentage points. These numbers, however, mask heterogeneity across countries and cannot unambiguously be contributed to educational policymaking. Short term economic influences arise from the opportunity cost of schooling: labor. If students take classes, they do not earn a wage. The results indicate that an increase in wages (the opportunity cost) increases early school leaving. Long term economic influences originate from economic development (change in gross domestic product). The economic growth rate is negatively correlated with early school leaving. Finally, the benchmarking model accounts for time and country fixed effects. The former capture, e.g., the increasing awareness of the importance of a high school diploma, the latter capture the non-economic incentives to dropout.

The results point out that Portugal, Denmark and the Netherlands have benefitted the most from job market conditions and economic growth. In contrast, economic circumstances had unfavorable influences on early school leaving in Sweden and Finland. Controlled for short and long term economic environment, and for time and country fixed effects, Luxembourg educational policy was most effective with a decrease in early school leaving of 2.4 percentage points (a relative decrease of 14%). Also named are the Netherlands (-1.19 percentage points), Belgium (-0.87) and Germany (-0.68). Three countries can be shamed as they experienced clearly positive short and long term economic influences, however, accompanied with an ineffective educational policy. The economic environment pushed dropout down in Portugal by 21 percentage points, while the policy component soared dropout rates by 12.91 percentage point. Also Spain (+5.02 percentage points) and Denmark (+2.9 percentage points) did not succeed in developing an effective early school leaving policy.

Although only suggestive evidence is available to explain the ‘net’ policy effect, we observe a close link with vocational education and its organization. Students enrolled in vocational education are more at risk of dropping out. Policy makers in countries with a higher enrolment rate in vocational education can more easily develop effective policy, for example, by limiting the impact of economic conditions on student outcomes. One may thus argue from the existing literature (see: Müller and Gangl, 2003) and in line with the results of our panel data benchmarking model that the school is nowadays more than ever intertwined with the labor market. In vocational pathways, the job market literally enters the inner circle of the school property, where employers and students already bargain for an optimal match between work and schooling. And also in school based pathways, students weigh the pros and cons of one extra year of schooling in respect of their job market aspirations (Allensworth, 2005).
Policy conclusion and guidance

The paper provides some clear policy conclusions. In line with the increasing accountability of schools, public utilities and countries, various national and supra-national organizations are focusing on output indicators. They rank units (e.g., schools, utilities, cities, countries) in terms of their performance on an indicator. Using the example of early school leaving, this paper provided evidence that relying on output indicators might name and shame the wrong units. Various observed and unobserved variables influence the output indicator. For example, if the general economic climate heavily influences the dropout rate, and if the economic climate is hard to influence by educational policy makers, than one may reasonably argue that this should be accounted for in a 'fair' benchmark regulatory framework. National and supra-national organizations which rely on indicators should thus at least correct for the observed influences (and preferably also for the unobserved time invariant influences). This paper provided a first attempt for a methodological framework to do so.

In this final paragraph, we provide some guidance to government officials and policy makers for using the proposed benchmarking model. The procedure works along four steps. In a first step, one should decide on the outcome variable of interest. As argued before, regulatory frameworks often use an outcome oriented procedure such that the selection of the outcome variable will be straightforward. Second, the relevant macro and micro variables influencing the outcome indicator should be discussed. To avoid an extensive list of control variables, one should clearly indicate for each variable why it matters. If possible, evidence on the influence should be looked for in the academic literature. Third, the proposed panel data benchmarking model should be applied. In a fourth and final step, the 'net' policy indicator can be related to more general variables at the system level. This might yield some suggestive evidence on why some units (e.g., countries, regions, schools) perform better than other units. This in turn provides new ways for making and evaluating policy.

As a final remark, note that one may argue that best performance should not only be measured by its outcomes. It may also be desirable to account for input factors (e.g., which measures did a country take to reach the policy goal?). In an indirect way, the proposed panel data benchmarking model is able to capture input measures that drove the outcome or, at least, is able to correlate with meaningful input factors, such as the organization of schooling and the quality of human resources.

References


[38] OECD (2006), Employment Outlook, Paris


### Appendices

#### Table 5: Job market conditions denoted by the first differences of the log hourly labor costs

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>1.49%</td>
<td>2.57%</td>
<td>2.01%</td>
<td>3.46%</td>
<td>1.35%</td>
<td>1.57%</td>
<td>1.12%</td>
<td>1.22%</td>
<td>0.64%</td>
</tr>
<tr>
<td>Belgium</td>
<td>4.70%</td>
<td>4.49%</td>
<td>1.40%</td>
<td>2.40%</td>
<td>1.05%</td>
<td>2.61%</td>
<td>3.53%</td>
<td>3.32%</td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>2.33%</td>
<td>7.30%</td>
<td>1.81%</td>
<td>4.18%</td>
<td>1.31%</td>
<td>4.08%</td>
<td>3.41%</td>
<td>4.87%</td>
<td>-</td>
</tr>
<tr>
<td>Finland</td>
<td>3.36%</td>
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<td>0.97%</td>
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<td>2.23%</td>
<td>5.23%</td>
<td>1.86%</td>
<td>2.43%</td>
<td>5.28%</td>
</tr>
<tr>
<td>France</td>
<td>5.25%</td>
<td>4.56%</td>
<td>3.92%</td>
<td>2.34%</td>
<td>2.78%</td>
<td>2.87%</td>
<td>3.23%</td>
<td>3.22%</td>
<td>2.31%</td>
</tr>
<tr>
<td>Germany</td>
<td>4.08%</td>
<td>2.37%</td>
<td>2.32%</td>
<td>2.26%</td>
<td>0.37%</td>
<td>0.74%</td>
<td>1.83%</td>
<td>0.72%</td>
<td>-</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>8.35%</td>
<td>3.65%</td>
<td>3.18%</td>
<td>3.04%</td>
<td>10.36%</td>
<td>3.70%</td>
<td>2.70%</td>
<td>3.14%</td>
<td>1.89%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>5.39%</td>
<td>6.80%</td>
<td>5.34%</td>
<td>4.88%</td>
<td>2.91%</td>
<td>0.66%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Portugal</td>
<td>1.74%</td>
<td>5.62%</td>
<td>5.65%</td>
<td>5.35%</td>
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#### Table 6: Economic development denoted by the first differences of the log per capita GDP

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<td>4.55%</td>
<td>-12.97%</td>
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</table>
Figure 3: Enrollment rates of boys in vocational education and training (ISCED 3) and change in dropout thanks to policy (data EUROSTAT).

Figure 4: Mean index of the quality of the schools’ educational resources and change in dropout thanks to policy (data OECD pisa 2006), R* denotes R squared of EU-12
Figure 5: Mean index for availability and quality of human resources and change in dropout thanks to policy (data OECD pisa 2006). $R^* \text{ denotes } R \text{ squared EU-12}$