Effective Programming Practices for Economists

Data Analysis in Python

Running regressions using statsmodels

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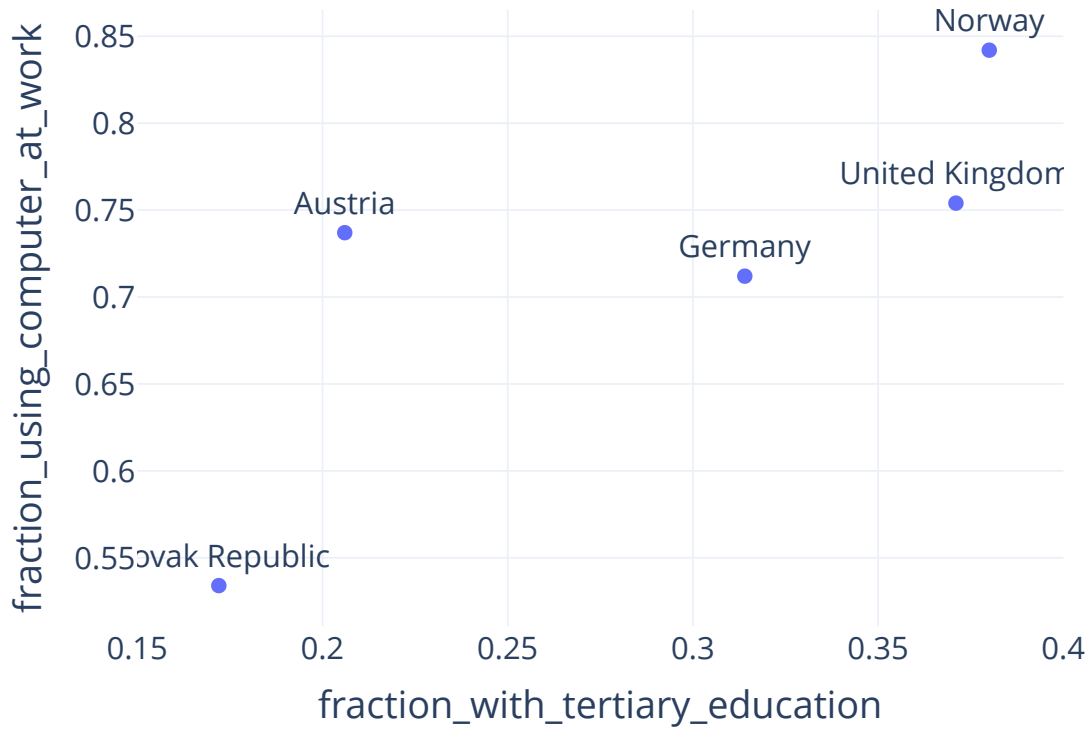
Example

country	fraction_with_tertiary_education	fraction_using_computer_at_work
Slovak Republic	0.172	0.534
Austria	0.206	0.737
Germany	0.314	0.712
United Kingdom	0.371	0.754
Norway	0.38	0.842

Example


Norway
United Kingdom
Austria
Germany
Slovak Republic
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.15
0.2
0.25
0.3
0.35
0.4
fraction_using_computer_at_work
fraction_with_tertiary_education

Importing conventions

- Plain statsmodels

```
import statsmodels.api as sm
```

- Formula interface

```
import statsmodels.formula.api as smf
```

The formula interface

```
>>> model = smf.ols(
...     data=df,
...     formula="fraction_using_computer_at_work ~ fraction_with_tertiary_education",
... )
```

- Use a regression model implemented in `statsmodels.formula.api`
- `data` is a dataframe, `formula` is a string
- Separate left-hand side and right-hand by `~`

The formula interface

```
>>> model = smf.ols(
...     data=df,
...     formula="fraction_using_computer_at_work ~ fraction_with_tertiary_education",
... )
```

- Intercept is implicit for OLS
- Right hand-side can contain lots of mathematical expressions
  - `+`, `**`, `*`, `:` for sums, powers, interactions
  - `C()` for categorical variables
  - `np.log()` for logarithms (and any similar functions)

Model objects

```
>>> model = smf.ols(
...     data=df,
...     formula="fraction_using_computer_at_work ~ fraction_with_tertiary_education",
... )
>>> model
<statsmodels.regression.linear_model.OLS at 0x7fb56c905250>
```

- Almost always, the next step is to call the `.fit()` method on the model object.