

Effective Programming Practices for Economists

Python Installation and Execution

Modifying Pixi environments

Janoś Gabler, Hans-Martin von Gaudecker, and Tim Mensinger

The pyproject.toml file

```
# pyproject.toml

[tool.pixi.project]
name = "toy-project"
channels = ["conda-forge"]
platforms = [
    "linux-64",
    "osx-64",
    "osx-arm64",
    "win-64",
]
[tool.pixi.dependencies]
python = ">=3.13"
numpy = ">=2.2.3"
```

- The `pyproject.toml` file can be used to configure pixi for the project
- Dependencies are tracked in the `[tool.pixi.dependencies]` table
- Will see two ways of changing this:
 - Using `pixi add [package]` in a shell
 - Modifying it directly in `pyproject.toml`

What is in the environment?

```
$ pixi list
```

Package	Version	Build	Size	Kind	Source
_libgcc_mutex	0.1	conda_forge	2.5 KiB	conda	_libgcc_mutex
_openmp_mutex	4.5	2_gnu	23.1 KiB	conda	_openmp_mutex
bzip2	1.0.8	h4bc722e_7	246.9 KiB	conda	bzip2
ca-certificates	2025.1.31	hbcca054_0	154.4 KiB	conda	ca-certificates
ld_impl_linux-64	2.43	h712a8e2_4	655.5 KiB	conda	ld_impl_linux-64
libblas	3.9.0	31_h59b9bed_openblas	16.5 KiB	conda	libblas
libcblas	3.9.0	31_he106b2a_openblas	16.4 KiB	conda	libcblas
...					
libstdcxx	14.2.0	h8f9b012_2	3.7 MiB	conda	libstdcxx
libuuid	2.38.1	h0b41bf4_0	32.8 KiB	conda	libuuid
libzlib	1.3.1	hb9d3cd8_2	59.5 KiB	conda	libzlib
ncurses	6.5	h2d0b736_3	870.7 KiB	conda	ncurses
numpy	2.2.3	py313h17eae1a_0	8.1 MiB	conda	numpy
openssl	3.4.1	h7b32b05_0	2.8 MiB	conda	openssl
python	3.13.2	hf636f53_101_cp313	31.7 MiB	conda	python
python_abi	3.13	5_cp313	6.1 KiB	conda	python_abi
readline	8.2	h8c095d6_2	275.9 KiB	conda	readline
tk	8.6.13	noxft_h4845f30_101	3.2 MiB	conda	tk
tzdata	2025a	h78e105d_0	120 KiB	conda	tzdata

Adding dependencies

```
$ pixi add pandas
```

```
# pyproject.toml
```

```
[tool.pixi.project]
name = "toy-project"
channels = ["conda-forge"]
platforms = [
    "linux-64",
    "osx-64",
    "osx-arm64",
    "win-64",
]
```

```
[tool.pixi.dependencies]
python = ">=3.13"
numpy = ">=2.2.3"
pandas = ">=2.2.3, <3"
```

Adding dependencies (2)

- You can change the `pyproject.toml` file directly:
 - Add dependencies to the `[tool.pixi.dependencies]` table
 - When calling `pixi run` or `pixi install`, pixi will install the dependencies
- **Version constraints**
 - pandas version 2.2 or higher: `pandas = ">=2.2"`
 - pandas version 2.2.x: `pandas = "~=2.2"`
 - pandas version 2.2.0: `pandas = "==2.2.0"`
 - most recent version (*that is compatible with other packages*): `pandas = "*"`

Adding PyPi dependencies

```
$ pixi add --pypi pdbp          # pyproject.toml

[tool.pixi.project]
name = "toy-project"
channels = ["conda-forge"]
platforms = [
    "linux-64",
    "osx-64",
    "osx-arm64",
    "win-64",
]

[tool.pixi.dependencies]
python = ">=3.13"
numpy = ">=2.2.3"
pandas = ">=2.2.3,<3"

[tool.pixi.pypi-dependencies]
pdbp = "★"
```

The lock file

- Upon installation of dependencies, pixi creates the `pixi.lock` file
- The lock file contains the exact versions of the dependencies that were installed
- The lock file is automatically updated when any dependency is changed
- This ensures reproducibility of the environment / results
- The lock file **should** be committed to the repository