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Unit root tests

When conducting these tests, the structure of the time series determines which "model" we use:

	ADF	KPSS	
Model 1 → Pure RW	"none"	"mu"	fluc. zero
Model 2 → RW w/ drift	"drift"	"tau"	fluc. const
Model 3 → RW w/ drift & trend	"trend"		some trend

Augmented Dickey-Fuller (ADF) test

H_0 : there is a unit root, H_a : there is no unit root
 ↳ $I(1)$ ↳ $I(0)$

→ why "augmented"? Normal test assumes ϵ_t is not autocorrelated (bad for AR processes), ADF augments test regression w/ first-differenced lags of y .

→ Process:

Step 1: choose relevant model from above

Step 2: Conduct test, if tau test stat is smaller than a given critical value, you can reject H_0 at that sig. level.

Step 3: Check the autocorrelation of residuals. If there's many/patterned ACF lags then try increasing lags (take caution if you can't eliminate)

Step 4: Conduct same test on differenced series, to make sure the variable isn't $I(2)$. Test only checks for a single unit root.

KPSS test

H_0 : there is no unit root H_a : there is a unit root

→ Only diff. = step 3: If test stat is smaller than a given critical value you can maintain H_0 at that level.

