Elecxit

Richard Green
Joachim Geske
Iain Staffell

Electricity traders are like politicians...

they make expensive mistakes

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This is the web version of my slides – please roll your mouse over the speech bubble at the top left of some slides to see additional comments in the pdf

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Elecxit: The Impact of Barriers to Electricity Trade after Brexit

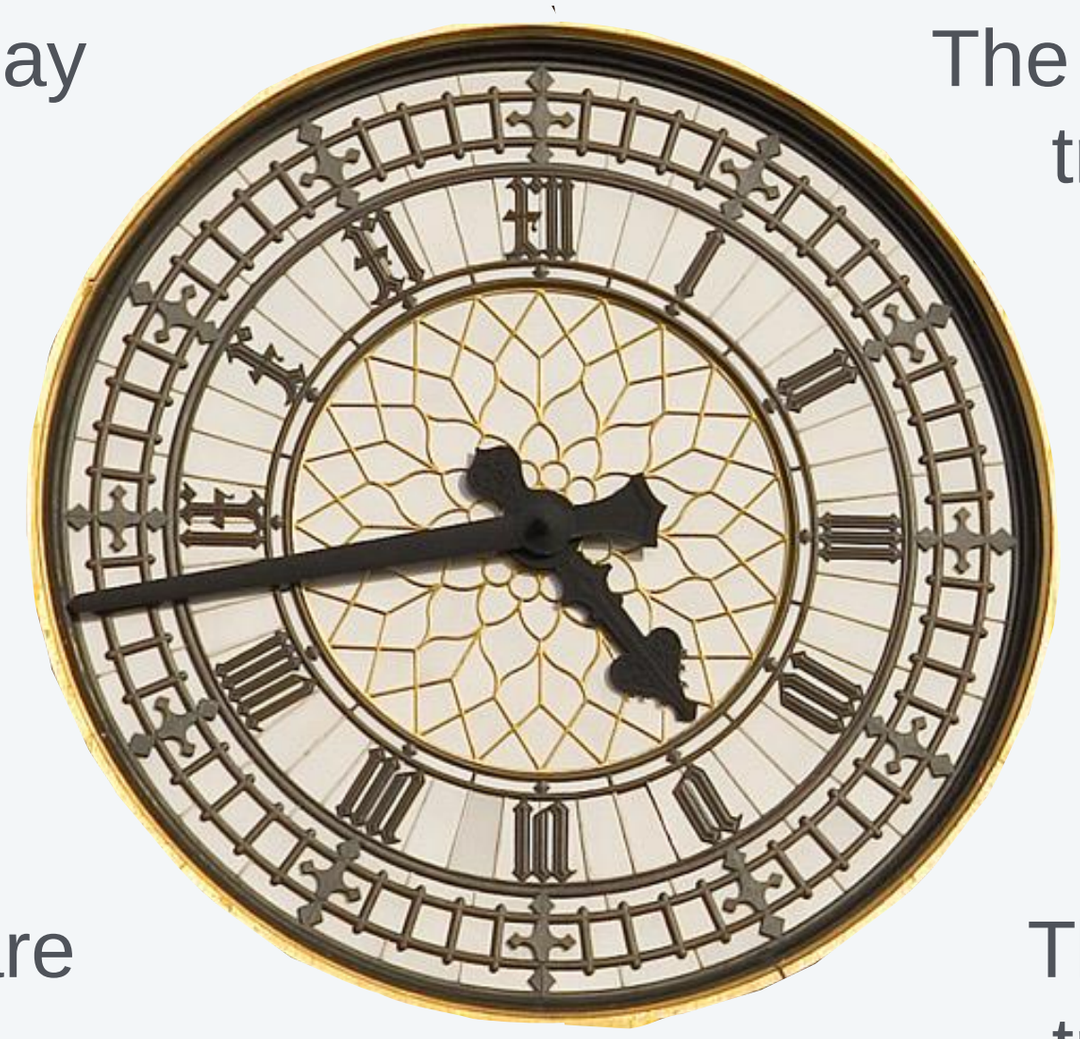
Joachim Geske, Richard Green and Iain Staffell

Toulouse Energy Conference, June 2019

What to expect…

…over €600m in 2030

What Elecxit may cost…



The Easy (EU) way to trade electricity

What traders are trying to do

The Hard way to trade electricity

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The easy way to trade power

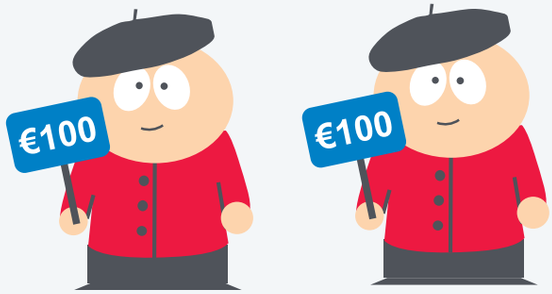
Life after Market Coupling

The easy way to trade power

Coupled markets: you only need to know your costs

Consumers

Consommateurs



Trader

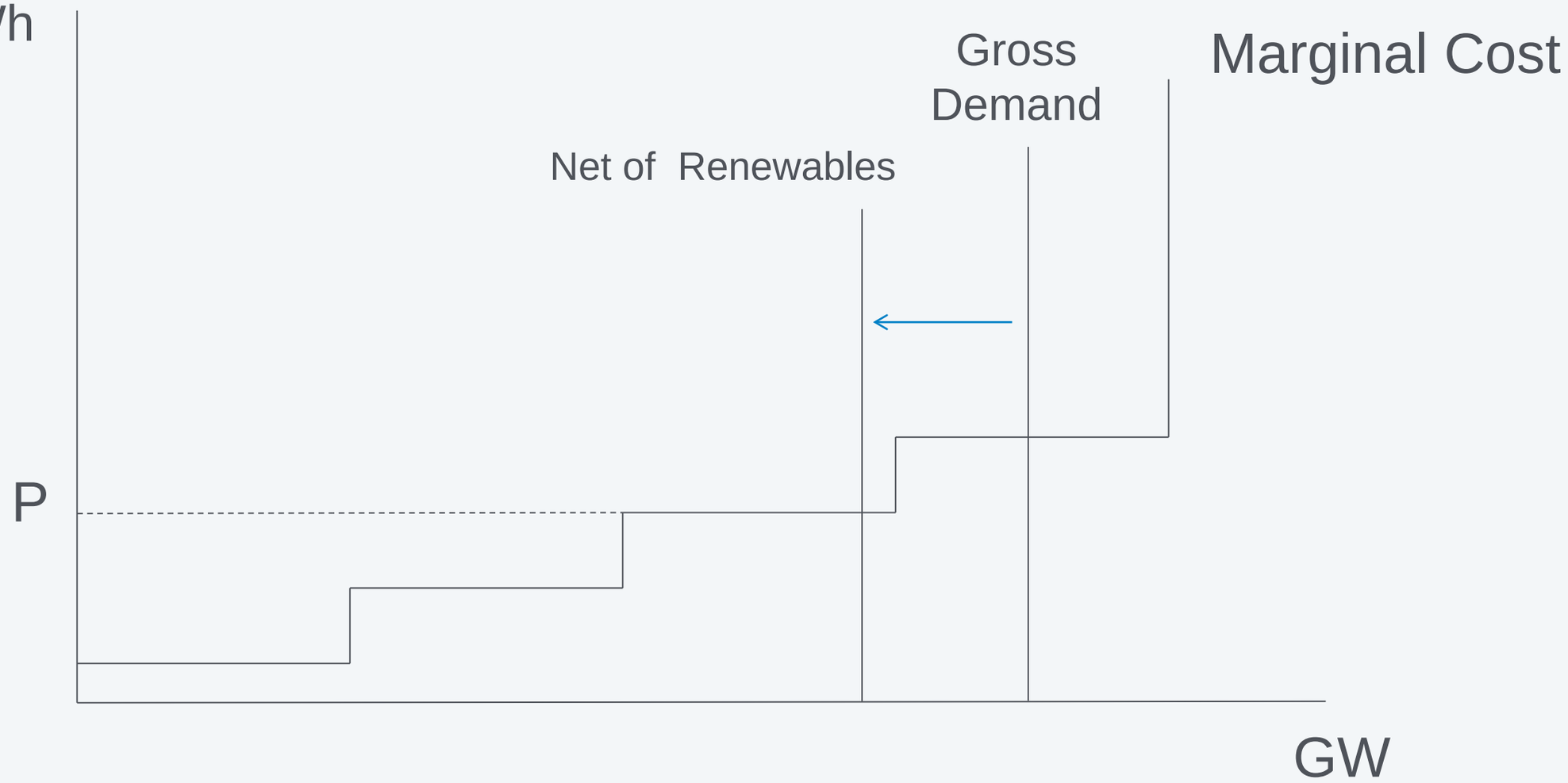
Price is €40/MWh

Price is €40/MWh

Generators

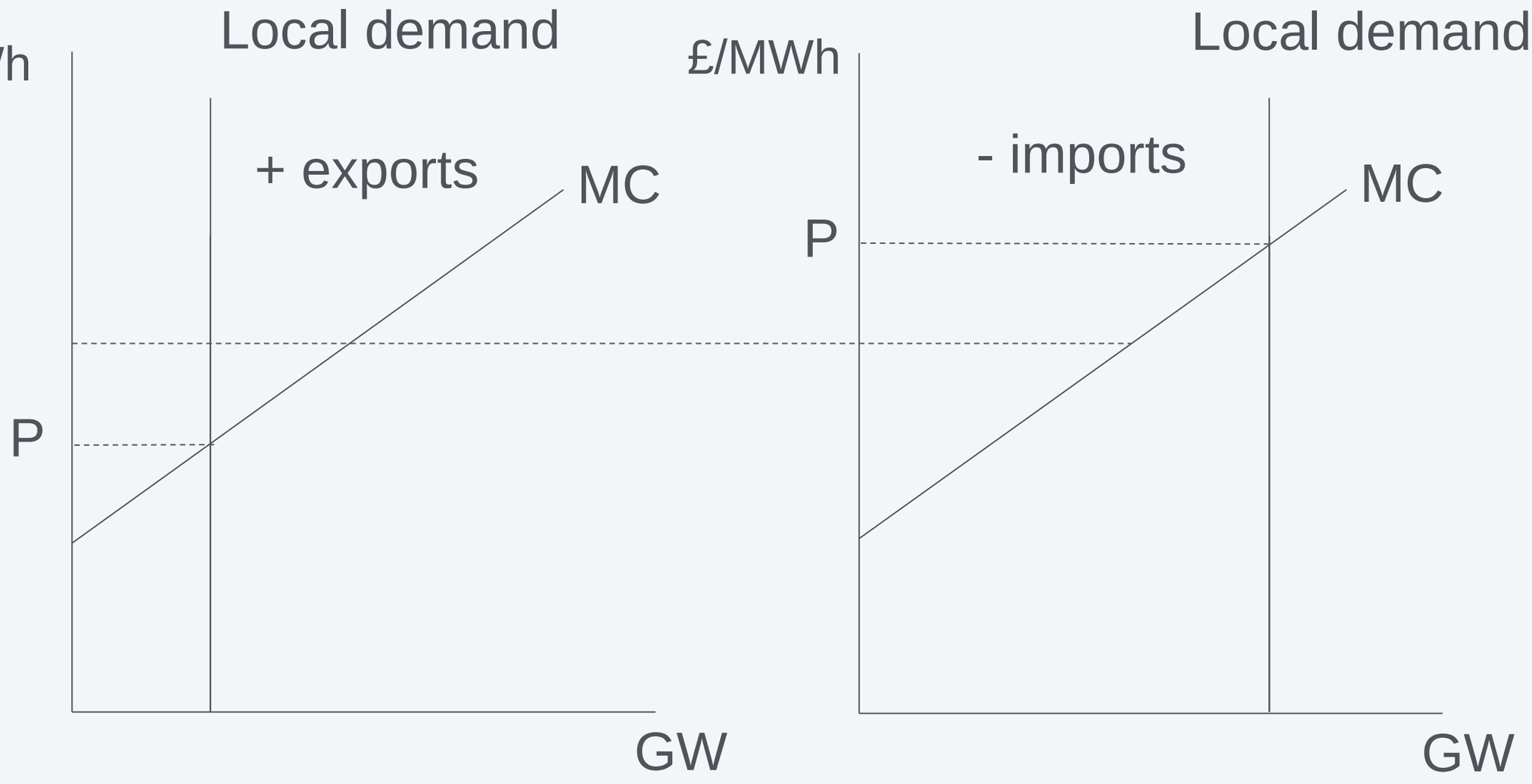
Générateurs

Dispatching electricity



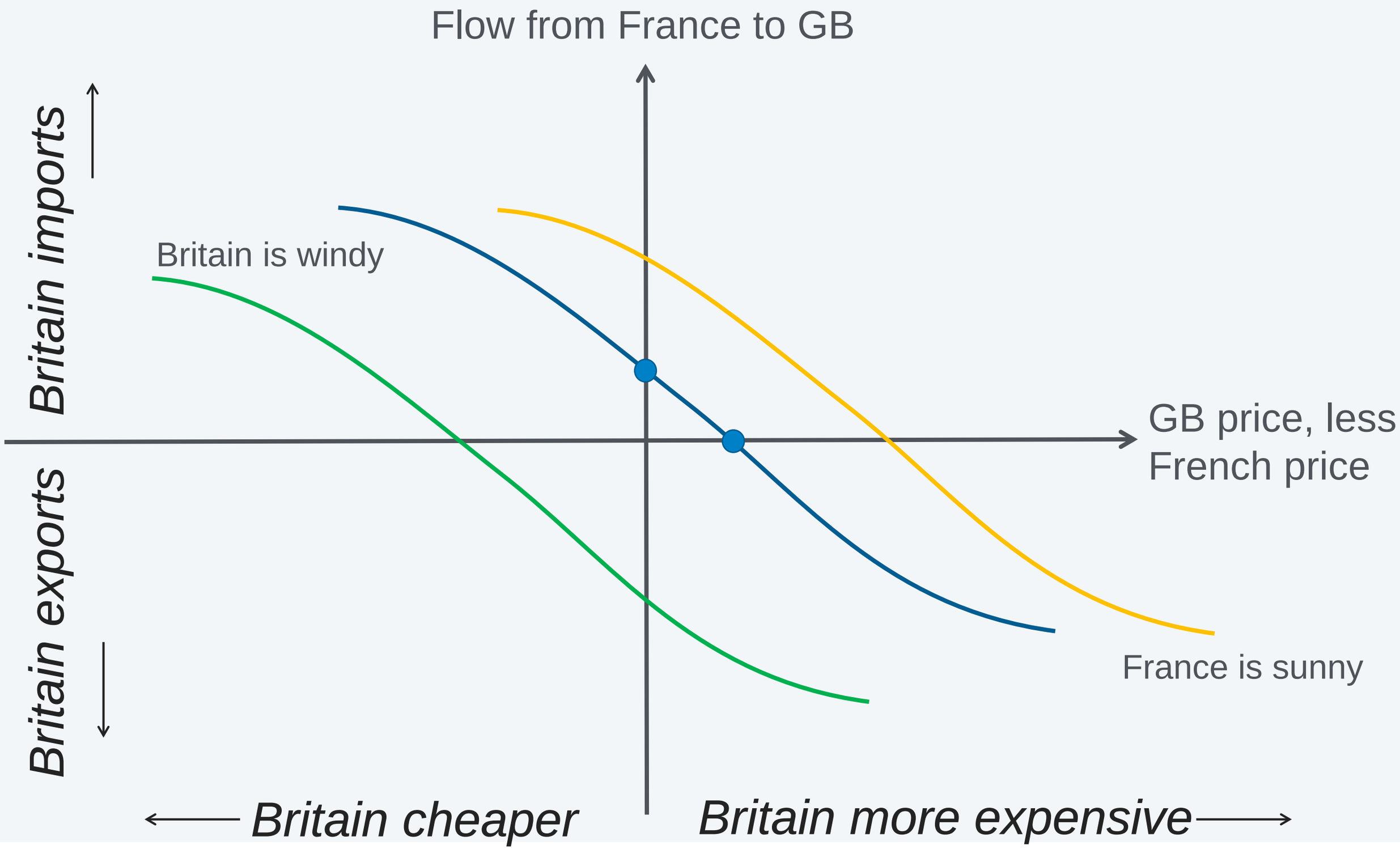
The gains from trade

Unconstrained transmission line



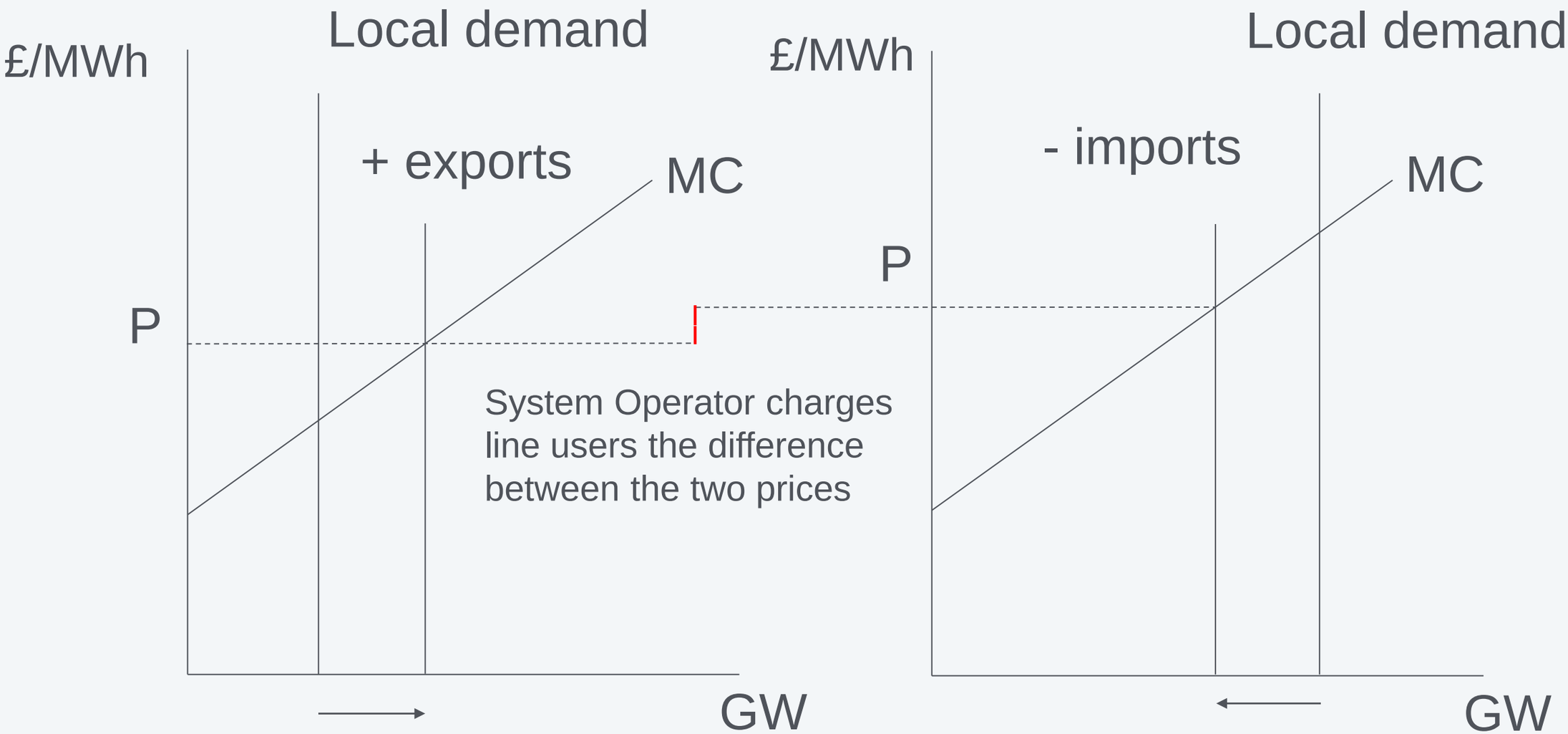
Exports and imports between zones allow the prices to equalise

Flows and resulting price differences



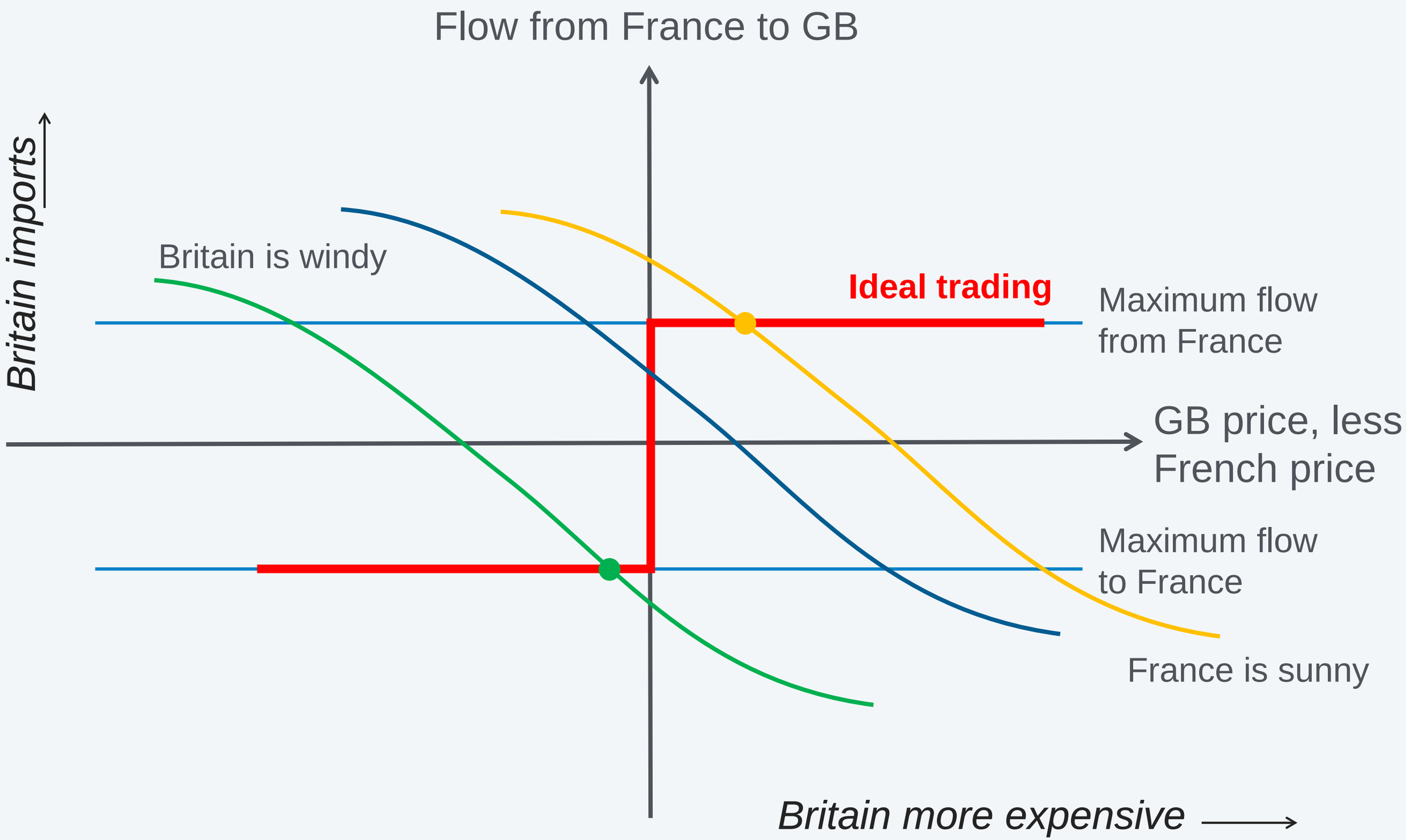
Trade on a constrained line

Power flows too low to equalise the prices



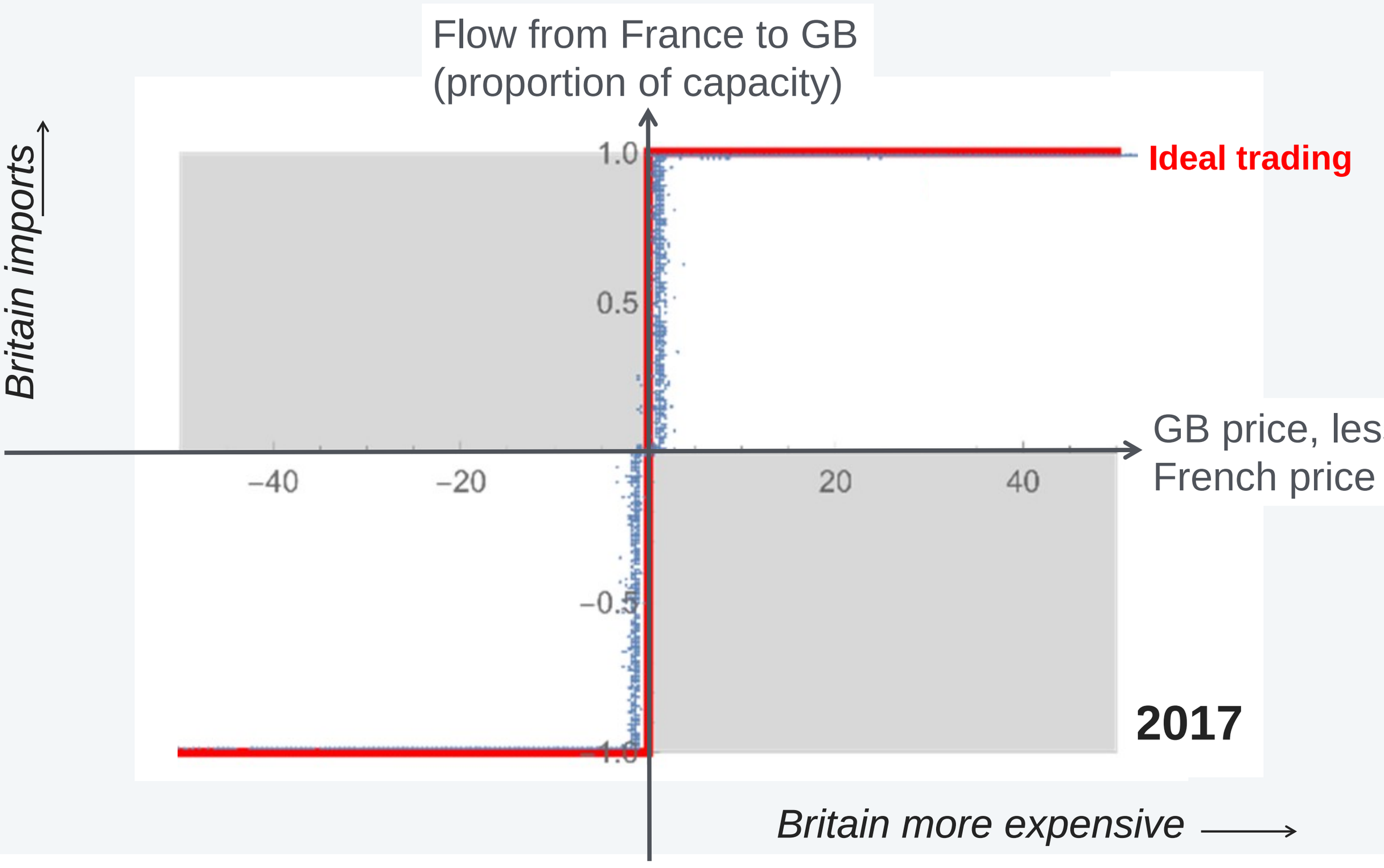
Flows and resulting price differences

Capacity limits stop prices from equalising



The easy way to trade power

Shaded areas represent “buy high, sell low”



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The hard way to trade power

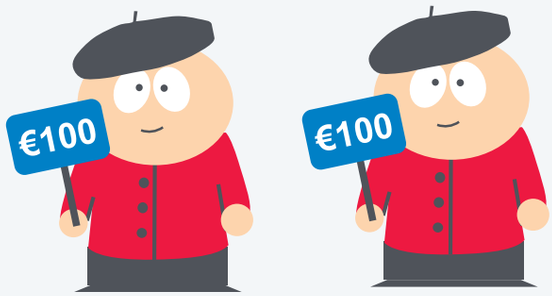
Life before Market Coupling

The hard way to trade power

Separated markets require forecasts

Consommateurs

Trader



Générateurs

The hard way to trade power

Separated markets require forecasts, which can be wrong…

Consumers

Consommateurs

Trader

Price is €25/MWh

Price is €40/MWh

Generators

Générateurs

The hard way to trade power

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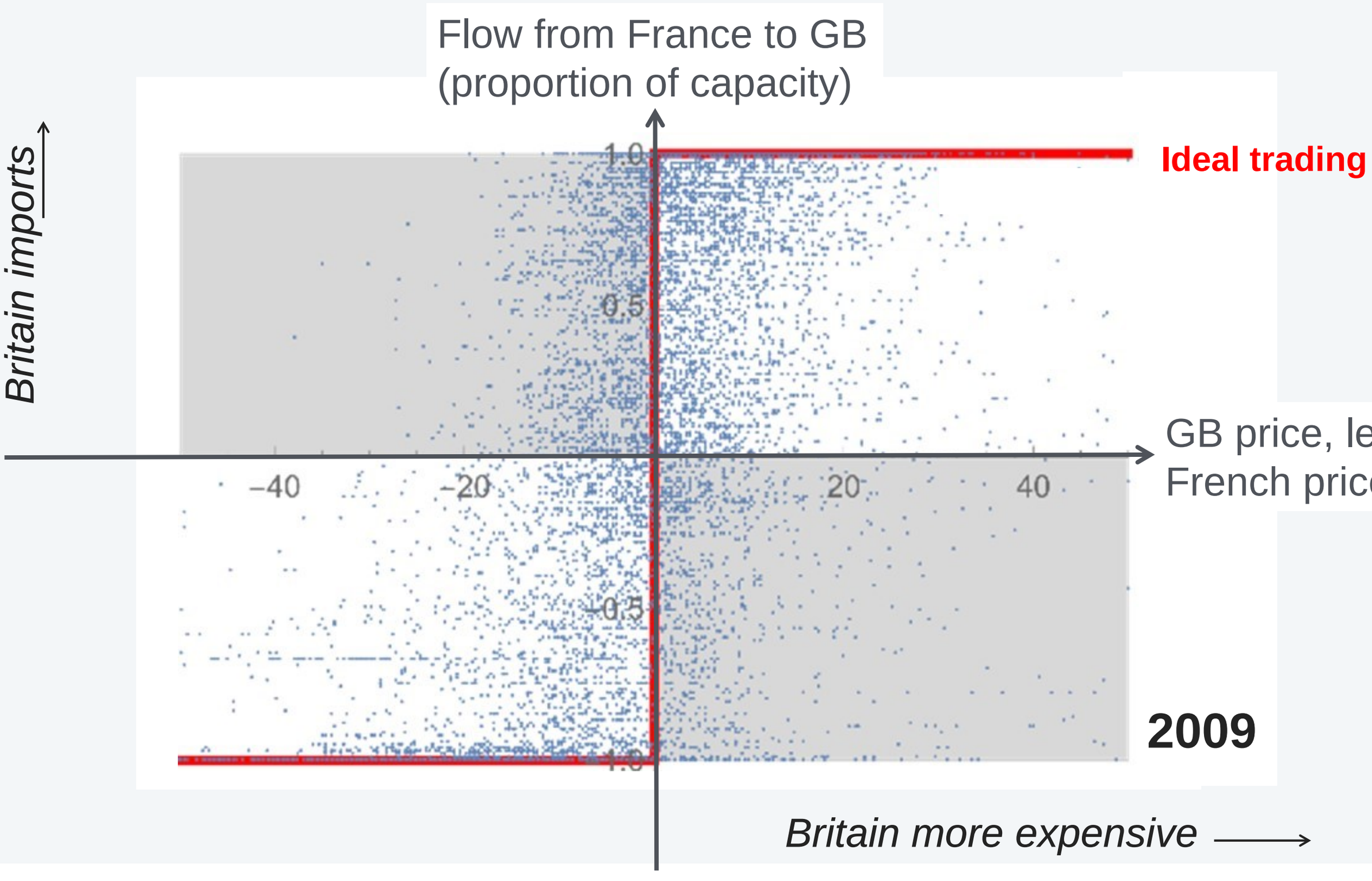

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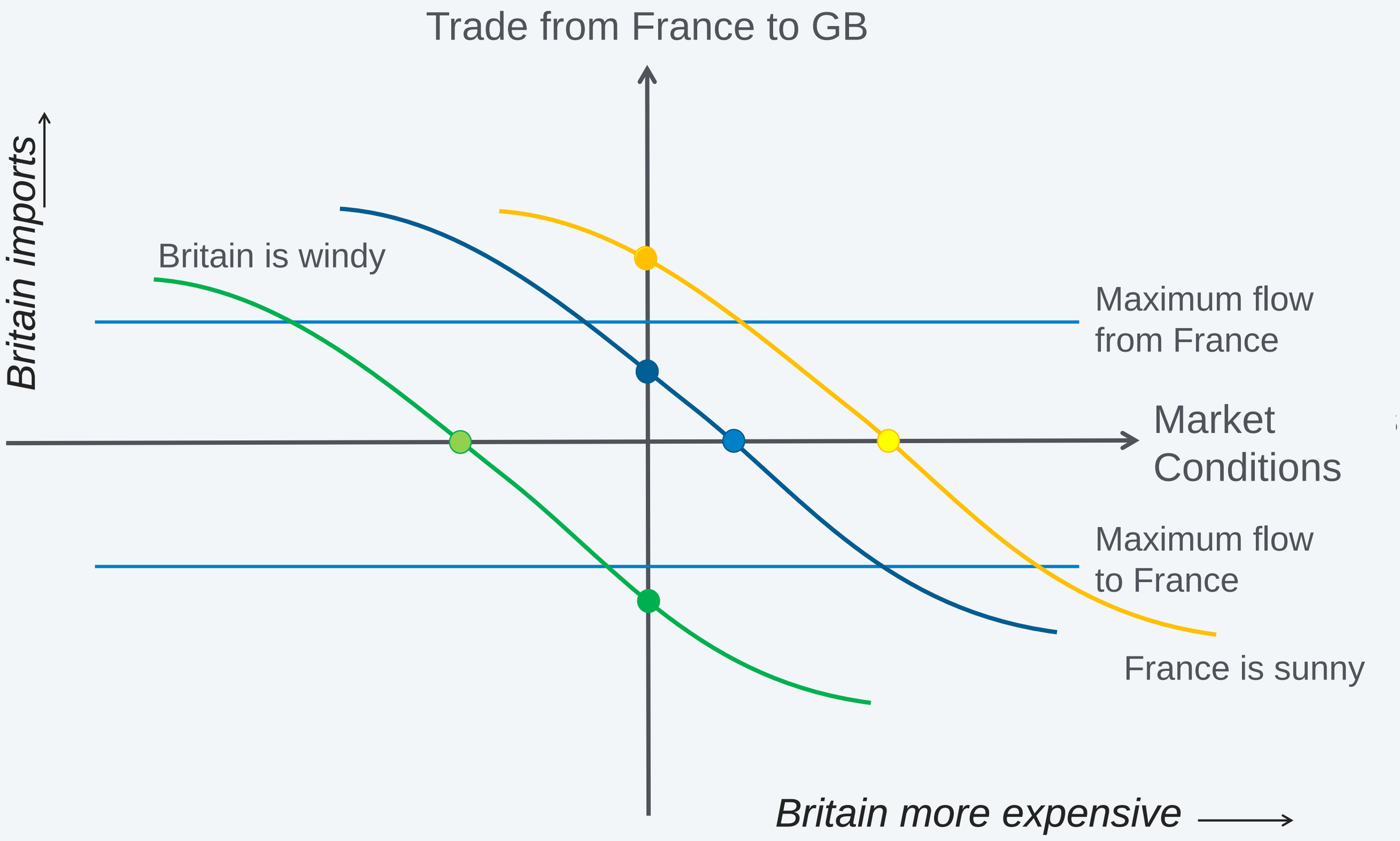
What were traders doing?

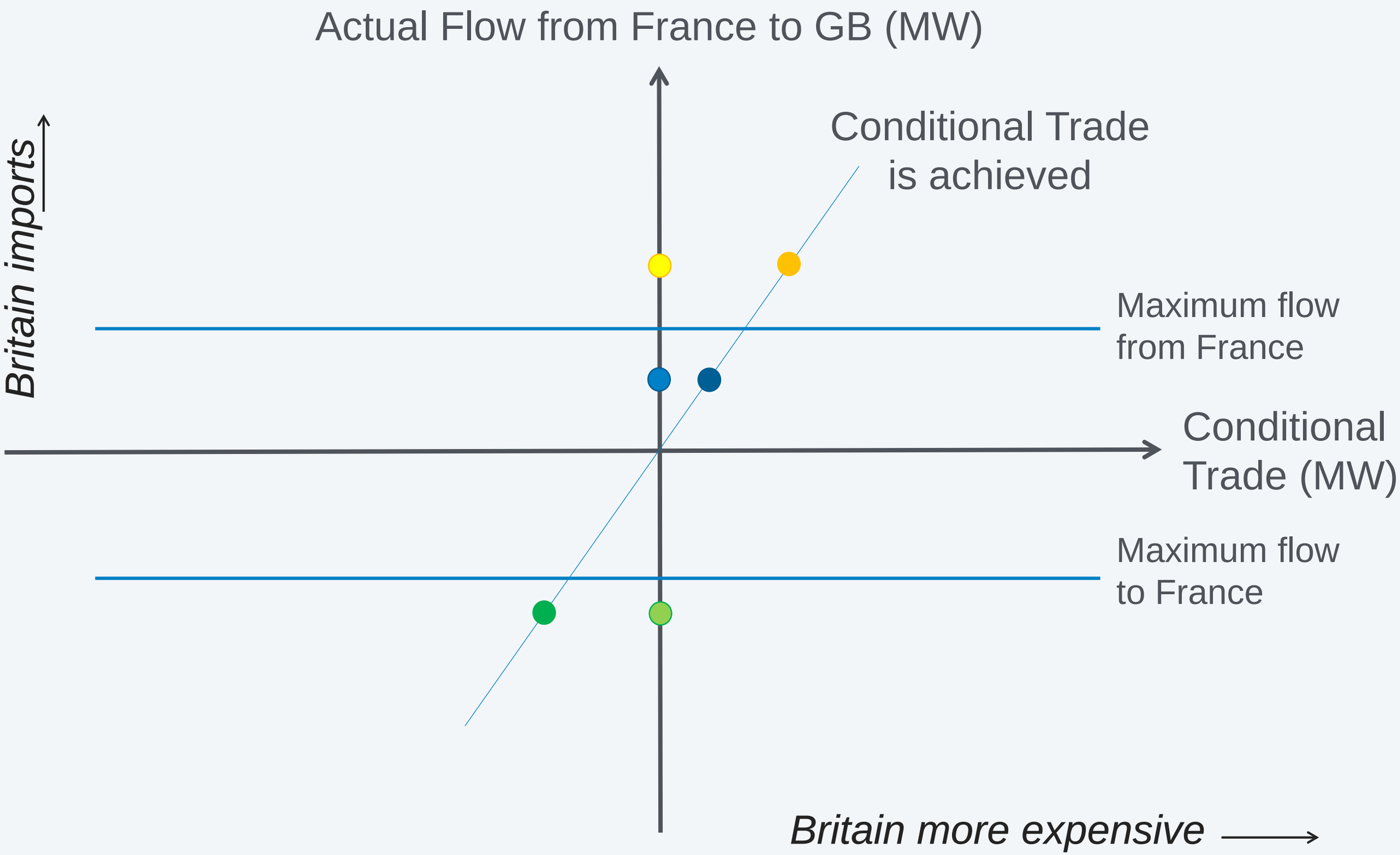
Desired flows depend on market conditions

“Conditional Trade” would equalise prices

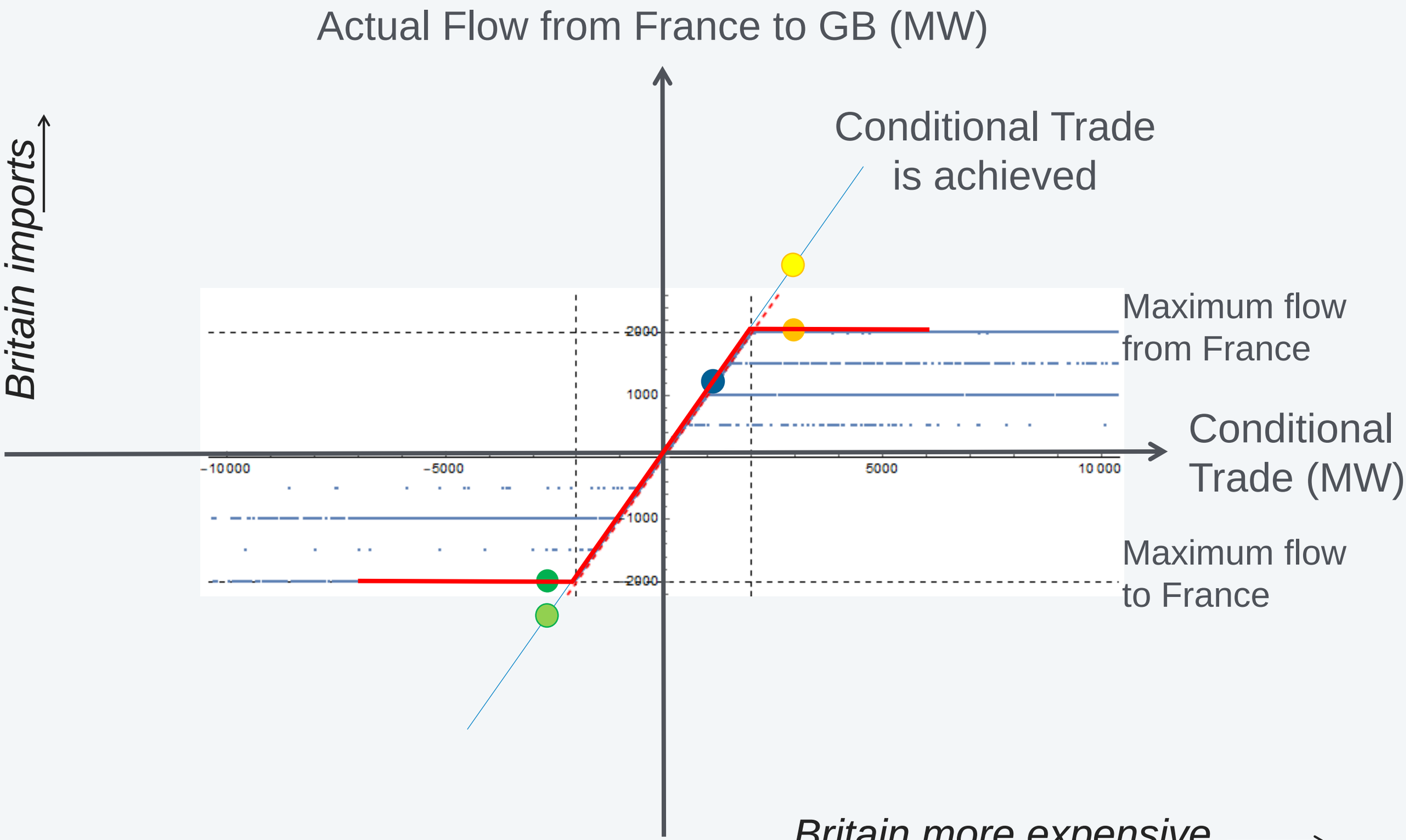


Actual flows must respect capacity limits

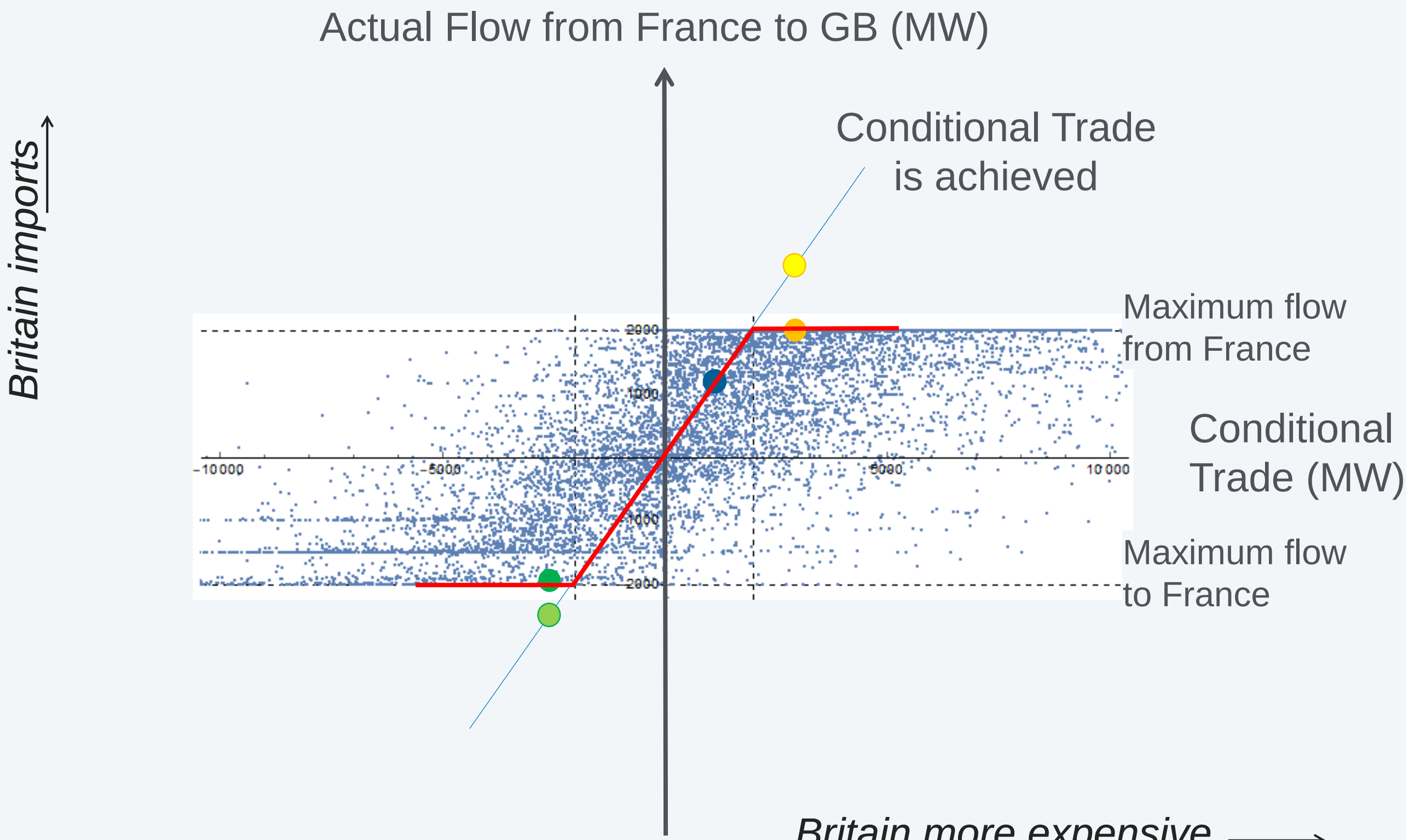
Conditional Trade often exceeds line capacity



Predicted and actual flows under market coupling (2017)



Predicted and actual flows without market coupling (2009)



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Estimating the relationship

How much were the lines under-used?

Tobit regression for “censored” data

We see Actual Trade$_h$ and Available Capacity$_h$

We estimate:

$$\text{Desired Trade}_h = \alpha + \beta\ \text{Conditional Trade}_h + \varepsilon_h$$

given:

$$\text{Actual Trade}_h = \text{Min}(\text{Desired Trade}_h, \text{Available Capacity}_h)$$

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Desired Trade$_h$: Amount traders would like to trade (given no capacity limits) in hour h

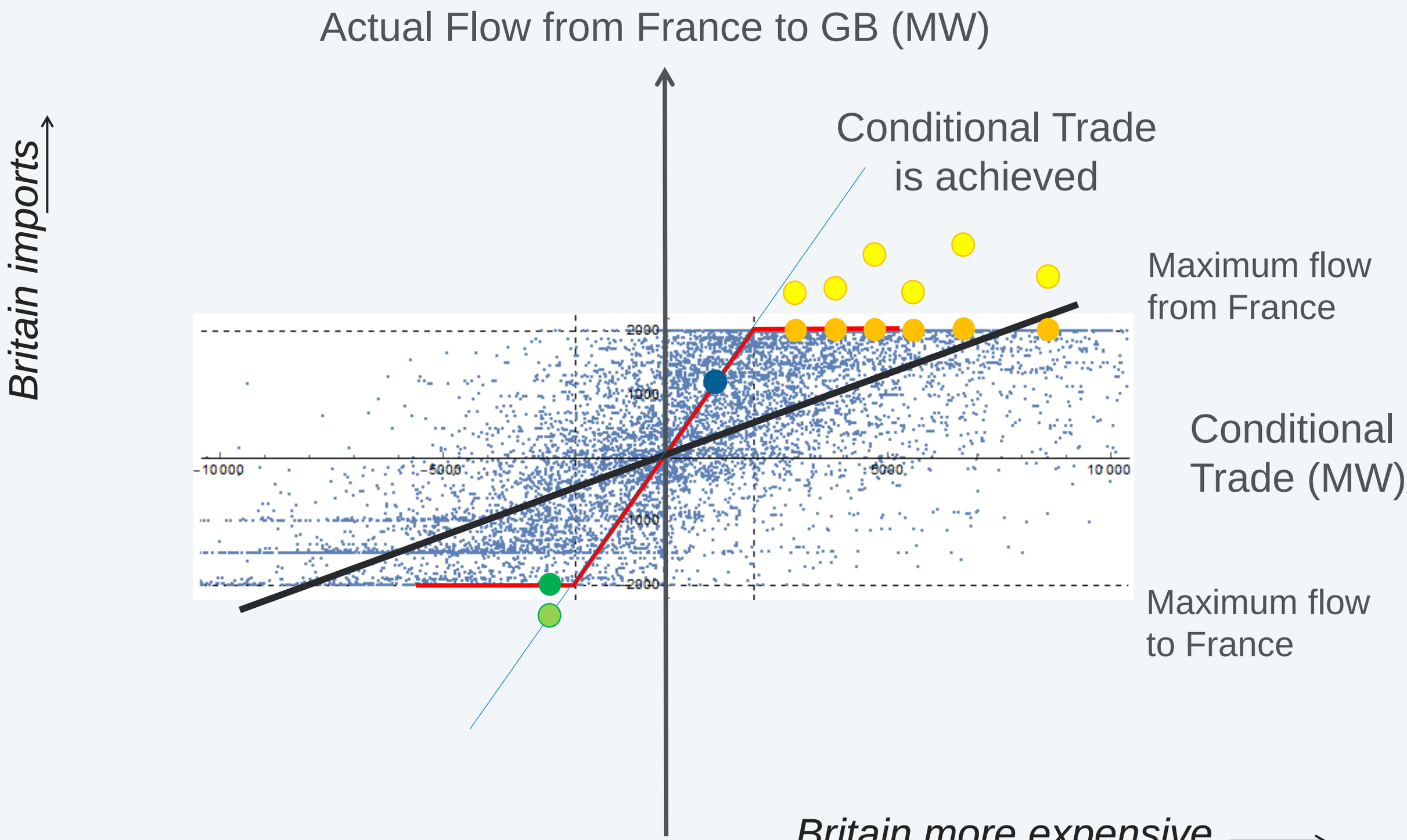
Conditional Trade$_h$: Amount to equalise prices, given market conditions in hour h

α and β are the parameters we estimate

ε_h is the error in our prediction

Predicted and actual flows without market coupling (2009)

Tobit regression line (black) shows Desired trade is 27% of Conditional



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Using this “model of mistakes”

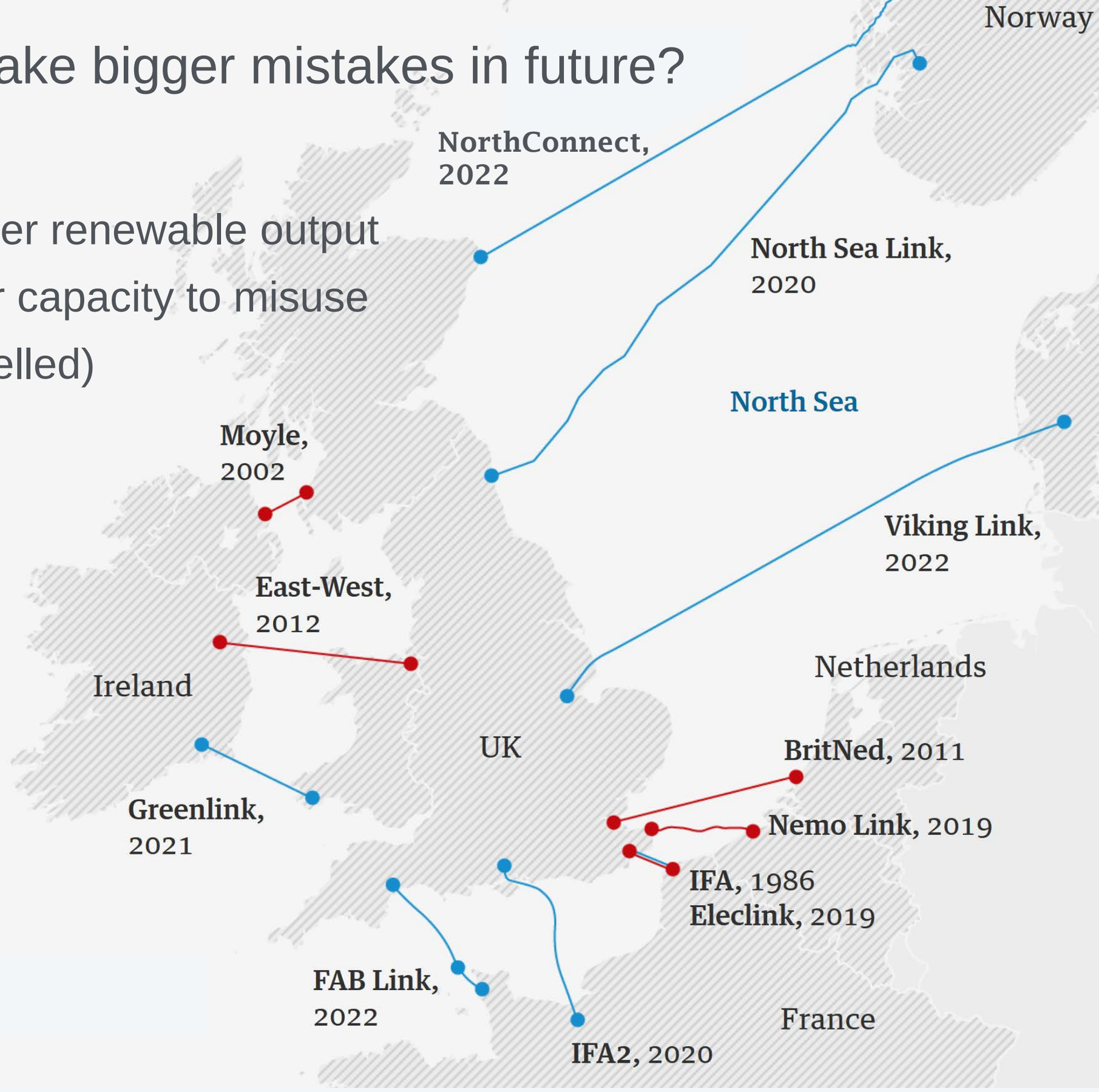
Scenarios for trading in 2030

Could traders make bigger mistakes in future?

More uncertainty over renewable output

More interconnector capacity to misuse

(unless it gets cancelled)



Brexit could increase costs

Change in generation cost [% of market value]		Interconnector Capacity Scenarios	
		5 GW	10 GW
Market Design Scenario	Uncoupled	Hard Elecxit **– 1.5%**	**– 1.4%**
	Integrated	**– 0.7%**	**Base Case** (Soft Elecxit)

- Market coupling saved 0.2% of costs when introduced

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Thank you

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