

LECTURE 3.2



The Fundamental Causes of Growth

ECON42550 Macroeconomics

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Autumn 2026

Where We Are

1. Short-Run Fluctuations

- 1.1 The Keynesian Multiplier
- 1.2 Introducing IS-MP-PC
- 1.3 Analysing IS-MP-PC
- 1.4 The Zero Lower Bound
- 1.5 Banks, Runs, the Cycle

2. NK Building Blocks

- 2.1 Expectations, Investment
- 2.2 Consumption, Fiscal Policy
- 2.3 Sticky Prices and the NKPC

3. Long-Run Growth

- 3.1 Growth Facts, Solow

3.2 The Fundamental Causes

- 3.3 Endogenous Growth
- 3.4 Schumpeterian Growth

Last Week's Lecture

Last week we built the Solow model, then ran the production function backwards to decompose measured growth.

1 The Facts.

Establish what has to be explained before building anything to explain it: growth compounds, and countries do not all converge.

2 The Solow Model.

Build the benchmark model of capital accumulation, solve it, and use it on two questions the exam asks.

3 Solow Confronted with Data.

Use the same production function backwards, to decompose measured growth.

Lecture Plan

1 Proximate and Fundamental.

Separate what *accounts* for growth from what *causes* it.

2 The Candidates.

Take each candidate cause seriously — luck, geography, culture, institutions — and see how far it gets.

3 Institutions.

Make the case for institutions, and confront the identification problem head on.

Whelan, Chapter 14

Reading: Whelan (2023, ch. 14).

SECTION 1

Proximate and Fundamental

1. Proximate and Fundamental
2. The Candidates
3. Institutions

Accounting Is Not Explaining

Growth accounting splits output growth into inputs and the Solow residual (g_t^B):

$$g_t^Y = \underbrace{\alpha g_t^K + (1 - \alpha) g_t^L}_{\text{factor accumulation}} + g_t^B \quad (1)$$

Every Term on the Right Is an Outcome

A country accumulated capital, or raised its residual — the identity never says why.

Proximate Causes and Fundamental Causes

Two questions that sound like one question, and are not.

A Proximate Cause

A term that appears *in* the production function: capital, labour, human capital, technology. It answers “what is output made of?”

A Fundamental Cause

A force that decides how much of each proximate cause a country has. It answers “why does this country have so little capital?”

An Identity Can Never Answer a Why

Growth accounting is entirely about proximate causes, as an identity must be. An identity cannot answer “why are some countries rich?”

Income Per Head Differs by Multiples, Not Margins

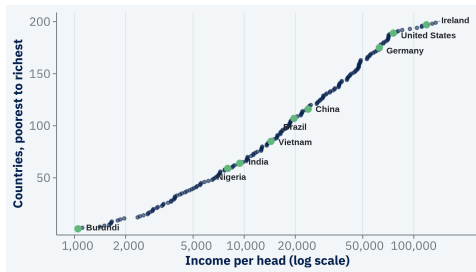


Figure 1: Income per head across countries today, on a log scale.

Equal Distances Are Equal Ratios

The axis is **logarithmic**. Read a distance as a ratio, not as a difference.

What Would Count as a Cause

Four candidates, and the argument over fundamental causes runs between them:

1. **Luck:** Two identical countries can end up apart, on self-fulfilling expectations.
2. **Geography:** Climate, disease, soil and distance from markets are fixed, and differ.
3. **Culture:** Beliefs, norms and trust shape how people trade, save and contract.
4. **Institutions:** The rules on who may own and who may be expropriated are chosen.

Only Institutions Are Chosen

A government can rewrite property law. It cannot change the country's latitude.

The Same People, Two Countries

In 1945 the Korean peninsula was one country, with one climate and language. In 1948 outsiders drew a line across it. Opposite systems have governed the two halves ever since.

Question

Which of the four candidates can explain the gap between the two Koreas?

Think on your own, then take ninety seconds with the person beside you.

Proximate or Fundamental?

The first section rests on one distinction, and it is easy to blur.

Question

What is the difference between a proximate cause and a fundamental cause?

Write one sentence on each without looking, then compare with your neighbour.

SECTION 2

The Candidates

1. Proximate and Fundamental
2. The Candidates
3. Institutions

Luck Is Not the Same Thing as Randomness

Start with the weakest claim, the one people dismiss without hearing it. “Luck” here does not mean a coin toss. A country’s outcome can depend on what everyone expects everyone else to do. That expectation can settle in more than one place.

Why This Is Not a Silly Idea

My return to investing rises with how many others invest. So two identical countries can settle at full investment or at none.

Two Countries, Identical, Permanently Different

A share of firms that invest is self-reproducing when it solves:

$$x^* = F(x^*) \quad (2)$$

- x : the share of firms that invest
- $F(x)$: the share that *want* to invest when a share x already does
- x^* : a share that reproduces itself

A Star Is a Resting Point, Not an Optimum

x^* is where the economy stops, not where anything is maximised. If F slopes upward, several resting points can exist, some of them bad.

Geography Is Better Than Its Reputation

The strongest version of the geography case, before any objection to it:

- **Disease:** Tropical parasites shorten lives and lower the return to schooling.
- **Agriculture:** Tropical soils and rainfall give lower yields than temperate ones.
- **Distance:** Landlocked and remote countries face higher trade costs on everything.

Three Fixed Mechanisms Pointing the Same Way

Disease, tropical agriculture and distance from markets all lower income. None of the three can be changed.

The Equator Really Does Predict Income

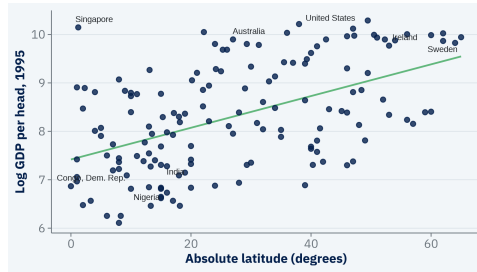


Figure 2: Income per head against absolute latitude.

Nearer the Equator, Poorer on Average

One point per country. The latitude gradient holds across the national-accounts era.

What Geography Cannot Explain

Geography never changes: its strength as an explanation, and the case against it:

- **Two Koreas, Two Germanys:** Same latitude and climate, very different outcomes.
- **Borders:** Income often changes sharply at a national border, and climate does not.
- **Reversals:** Places that were richest five hundred years ago are now among the poorest.

An Argument About How Much, Not Whether

Nobody sensible claims malaria is costless. Geography cannot carry the largest divergences: those came faster than geography changes.

What People Trust Changes What an Economy Can Support

Beliefs and norms decide which transactions are possible at all:

- A contract is cheaper to enforce where it is normally kept.
- Trade with strangers is possible where strangers are trusted.
- Attitudes to work, saving and schooling differ, with measurable economic consequences.

Weber's Claim Is Still Unsettled

Weber argued that the Protestant Reformation reshaped attitudes to work and saving. He took that to be why northern Europe industrialised first.

Why Culture Is Hard to Test

Geography failed because it never changes; culture fails for the opposite reason:

- **Measurement Is Weak:** Survey answers about trust are not records of behaviour.
- **Trust Rises with Income:** Being rich and well policed may be what breeds trust.
- **Rules May Produce Trust:** Where courts enforce contracts, trust is cheap.

Reverse Causation Is Not Special to Culture

The institutions case faces the same objection: income may buy good rules.

Geography and Culture Fail Differently

Both candidates have now been stated at their strongest and then answered.

Question

What is the strongest objection to geography, and the strongest objection to culture? Why are the two objections different?

Write one line on each, then compare with your neighbour.

SECTION 3

Institutions

1. Proximate and Fundamental
2. The Candidates
3. Institutions

The Institutions Hypothesis

Nobody plants a crop they expect to have taken. Nobody builds a factory the president's cousin can seize. The rules on owning and investing decide whether the proximate causes accumulate.

Institutions Set Inputs Rather Than Enter Them

Institutions do not enter the production function. They decide how much capital and schooling a society accumulates. That is what a fundamental cause does.

The Data Measure Expropriation Risk, Not the Rules

Two definitions, and the empirical literature measures only the second:

Broader Than Any Dataset Captures

Institutions: the rules, formal and informal, on property, contracts and entry.

Most Empirics Measure Only the Executive

Constraints on the executive: how far the powerful are stopped from seizing property.

Countries That Protect Property Are Richer

Each point is a country, scored on how safe property has been from seizure.

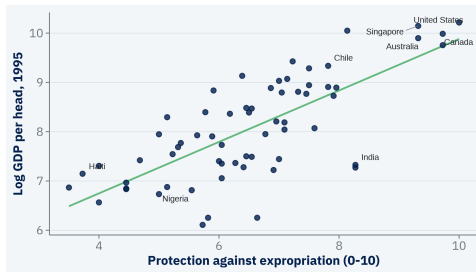


Figure 3: Income per head against protection against expropriation risk, former colonies.

Question

Does this picture show that better institutions **make** countries rich?

The Identification Problem

Fit a line to the income–institutions scatter, holding other country characteristics (Z_i) fixed:

$$\log y_i = \beta_0 + \beta_1 \underbrace{\text{INST}_i}_{\text{institutional quality}} + \beta_3 Z_i + u_i \quad (3)$$

- y_i : income per head in country i
- INST_i : a measure of institutional quality
- u_i : everything about country i that is not measured

u_i Is Where the Whole Lecture Lives

u_i is not noise. It holds every determinant of income nobody put in the regression. Whether the institutions coefficient (β_1) means anything depends on u_i .

Three Reasons That Coefficient Is Not the Effect

$\hat{\beta}_1$ is the effect of institutions only if $INST_i$ and u_i are unrelated:

1. **Reverse Causality:** Good institutions are expensive, so income can buy them.
2. **Omitted Variables:** Whatever raises both income and institutions sits inside u_i .
3. **Measurement Error:** The indices are noisy proxies, which pulls the coefficient towards zero — and expert assessors already know how rich the country is, which pushes it the other way.

Correlation Identifies Nothing on Its Own

The same scatter fits all three failures, and fits no effect of institutions at all.

What Would Settle It

Data identify the effect of institutions only under one condition. Institutions must vary for a reason unconnected to national income:

- The Korean division assigned institutions by accident, and held geography fixed.
- A single comparison is an anecdote with a control group.
- The same design across many countries would estimate the effect of institutions.

Credible Because No One Planned It

A **natural experiment** assigns different treatments to comparable places by historical accident. The reason for the assignment is unconnected to the outcome.

The Colonial Experiment

Europeans colonised most of the world between the sixteenth and nineteenth centuries. They did not build the same institutions everywhere. Acemoglu, Johnson and Robinson (2001) argued that European mortality decided which. Each link can be checked:

1. **Where Europeans Died, They Did Not Settle.** Malaria and yellow fever.
2. **Where They Did Not Settle, They Extracted.** Rules built to take resources out.
3. **Where They Settled, They Protected Property.** Settlers lived under their own rules.
4. **Those Institutions Persisted.** Independence changed the rulers, not the rules.

This Correlation Cannot Run Backward in Time

Higher settler mortality two centuries ago predicts weaker institutions today. Today's income cannot have caused a mortality rate two centuries old.

Settler Mortality as an Instrument

Regress institutional quality today on the mortality Europeans faced then:

$$\text{INST}_i = \pi_0 + \pi_1 \log M_i + \pi_2 Z_i + v_i \quad (4)$$

- M_i : the death rate among early European soldiers and settlers in country i
- π_1 : how strongly early mortality predicts institutions today
- v_i : the part of institutions that mortality does not explain

Estimate this first stage; use the **fitted** institutions in the income equation.

It Keeps Only the Variation History Assigned

An **instrument** predicts the cause and reaches income only through the cause.

The First Stage, and the Reduced Form



Figure 4: Institutions today against log settler mortality.

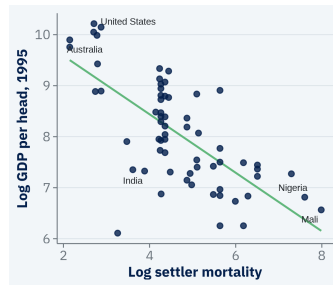


Figure 5: Income per head today against log settler mortality.

Mortality Predicts Institutions, and Predicts Income

Places deadly for Europeans now have weaker institutions (left), lower income (right).

Colonisation Should Have Turned the Ranking Over

Add one link to the chain, and the design makes a second prediction:

- A **rich, crowded** place in 1500 was worth extracting from, not settling in.
- An **empty** place had little to extract, and was worth settling in.
- So extractive institutions went to the rich places, settler institutions to the poor.

A Prediction the Design Could Have Failed

If institutions persist, colonisation should have **reversed** the ranking of the colonised world.

The Ranking Did Turn Over

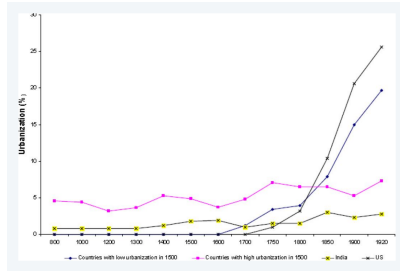


Figure 6: Urbanisation from 800 to 1920, for former colonies grouped by how urban they were in 1500.

The Two Groups Cross Over Around 1800

The places that were urban in 1500 are flat throughout. The sparsely settled ones overtake them, and keep going.

What the Natural Experiment Does and Does Not Settle

The whole design rests on one assumption, and it cannot be tested:

$$\text{Cov}(\log M_i, u_i) = 0 \quad (5)$$

An Exclusion Restriction Is an Argument, Not a Test

In words: settler mortality reaches income today **only** through institutions. No test can check it: u_i is by construction what nobody measured.

Three Reasons to Doubt the Design, None Fatal

Three objections, each a channel from mortality to income that skips institutions:

- **Disease Persists:** Malaria then predicts malaria now, lowering income directly.
- **The Data Are Contested:** The mortality rates come from records of varying quality.
- **More Than Institutions Changed:** Settlers brought religion, language and schools.

Measuring the Wrong Channel, Calling It Institutions

If one channel is large, the instrument measures it and calls it institutions.

Why Some Countries Are Rich

1 Proximate and Fundamental.

Accounting splits growth into inputs and a residual, and both are outcomes.

2 The Candidates.

Luck and geography have real effects but cannot carry the biggest divergences. Culture cannot be separated from the rules it grew up under.

3 Institutions.

The best-identified answer, resting on one exclusion restriction that cannot be tested.

Knowing the Method Beats Knowing the Result

State the exclusion restriction, and one credible violation of it.

Before Lecture 3.3

1 **Play:**

the toy models. The Solow app covers the proximate causes; today covered the fundamental ones.

2 **Apply:**

Problem set 6, due before Lecture 3.3. It covers Lectures 3.1 and 3.2.

3 **Review:**

Whelan, chapter 12, on endogenous technological change.

Next Week

Today explained how much a country accumulates, and left technology exogenous.

Technology Stops Falling from the Sky

Institutions decide how much a society accumulates. Lecture 3.3 asks where technology itself comes from.

Thank you

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BACKUP

Appendix

Notes and Tools

- **Whelan's lecture notes** — the notes for this module. Chapter 14 goes with today.
- **The toy models** — in your browser, nothing to install. Today has no app of its own; the growth-accounting app is the proximate half of the story.
- **The two colonial-origins papers** — Acemoglu, Johnson and Robinson (2001) and (2002), both on Brightspace.

Whelan Is the Only Required Reading

Everything else here is optional.

References

Whelan, K. (2023). *Lecture notes on macroeconomics*. University College Dublin.
<https://www.karlwhelan.com/Macro2/Whelan-Lecture-Notes.pdf>