ORIGINAL ARTICLE

OPEN ACCESS

Breaking the Stop-Go Cycle: Testing Balance of Payments Constrained Growth and Export Complexity in Pakistan, 1972 – 2025

Dr. Farman Ali [1], Dr. Nisar Ahmed Hattar [2], Sher Dil Khan [3], Jamil Ahmed Channa [4]

Authors' Affiliations:

[1]Department of Economics, Shah Abdul Latif University, Khairpur

[2]Department of Economics, Shah Abdul Latif University, Khairpur

[3]Ph.D Scholar, Department of Pakistan Studies, Islamia University Bahawalpur

[4]PhD Scholar, Department of Economics, Shah Abdul Latif University, Khairpur

Article History:

Submitted: July 21, 2026
Revised: August 18, 2026
Accepted: September 8, 2026
Published online: October 1, 2026

Corresponding author(s):

Dr. Farman Ali
Email: farmanshar@gmail.com

Co-author(s)Email:

Dr. Nisar Ahmed Hattar
Email: amarnisar1976@gmail.com
Sher Dil Khan
Email: sherdil114@yahoo.com
Jamil Ahmed Channa
Email: jamilchanna@gmail.com

ABSTRACT

Pakistan had an International Monetary Fund arrangement in force in 40 of the 53 fiscal years from FY1973 to FY2025. This paper asks whether its recurring cycle of import-led booms and forced stabilizations reflects a binding balance of payments constraint of the kind described by Thirlwall's law, and whether the falling complexity of its exports has tightened it. On a hand-collected, source-verified annual dataset, every trade equation is estimated twice, on national-accounts volumes and on dollar values at constant world prices, with ARDL bounds tests, Bai–Perron breaks, Hansen instability tests, a threshold nonlinear ARDL and complexity interactions. Constant elasticities yield no long-run relation, but once breaks near FY1980 and FY2003 - FY2005 are allowed for, all four demand equations pass the bounds test at 1 percent. The income elasticity of export demand fell from 1.29 to 0.67 after FY2005 at world prices (0.84 on volumes). The balance of payments-constrained growth rate for FY2005 - FY2025 is 2.9 - 4.0 percent against actual growth of 3.8 percent, and the McCombie test cannot separate them on either measure. At world prices, lower complexity raises the import elasticity and lowers the export elasticity, cutting the export-demand ceiling from about 4.8 to 2.2 percent between the complexity levels of FY1973 and FY2017. Remittances widened the ceiling, but imports absorbed the room they created. A 6 percent growth target would require exports to grow one and a half to two times faster than since FY2005. The estimates yield five decision rules for growth targets, export upgrading, remittance use and exit from Fund support.

Keywords: Balance of payments constrained growth, Thirlwall's law, economic complexity, structural breaks, ARDL bounds test, remittances, IMF programs, Pakistan.

1 | INTRODUCTION

1.1 | A Country That Keeps Meeting the Same Wall

On 25 September 2024 the Executive Board of the International Monetary Fund approved a 37-month Extended Fund Facility for Pakistan worth about US$7 billion. It came fourteen months after a nine-month

Stand-By Arrangement approved on 12 July 2023 (International Monetary Fund [IMF], 2024). Neither decision was unusual. In the data assembled for this paper, a Fund arrangement was in force in 40 of the 53 fiscal years from FY1973 to FY2025 (Figure 1). The Fund's own Independent Evaluation Office had already classed Pakistan among the most prolonged users of its resources a generation ago (IMF Independent Evaluation Office, 2002).

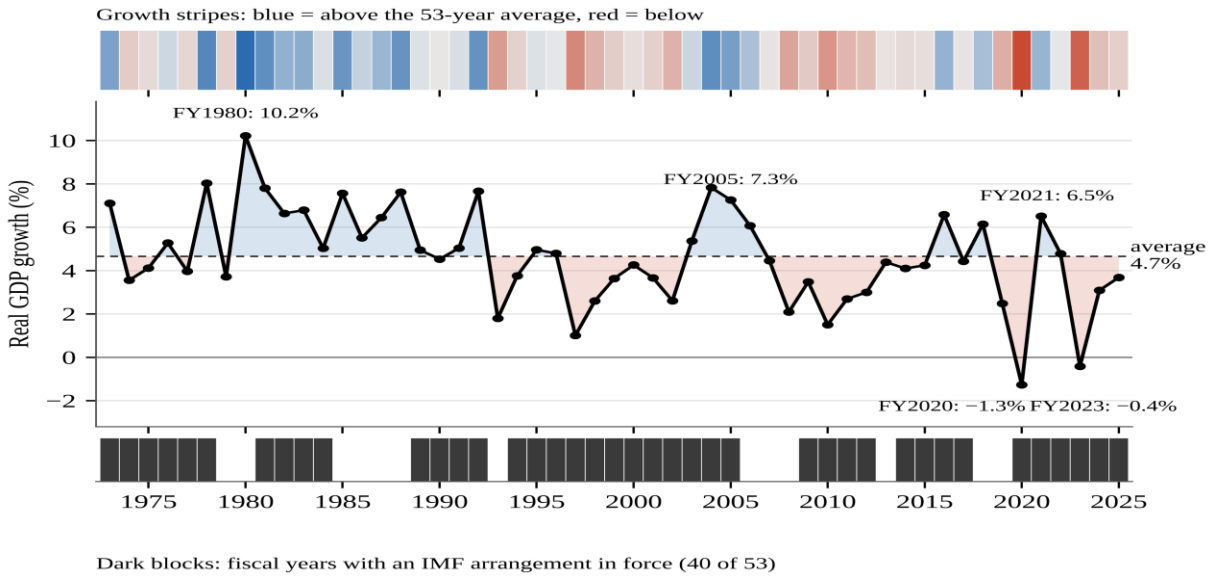
The usual account of each return to the Fund points to fiscal slippage, an overvalued exchange rate and reforms that were started and then reversed. These explain the timing of individual crises well. They explain the repetition less well. The most recent episode shows why. In FY2023 the dollar value of imports of goods and services fell by 28 percent, from US$84.3 billion to US$60.5 billion, and real output contracted by 0.4 percent. By FY2025 the current account showed a surplus of US$2.1 billion (State Bank of Pakistan, 2025a). The external accounts had been repaired, but the repair was bought with lost growth and not with a jump in exports.

This paper looks at the problem through the balance-of-payments-constrained growth model of Thirlwall (1979). The idea is simple. Over the long run a country cannot grow faster than the rate at which its exports grow, divided by the income elasticity of its demand for imports, unless someone is willing to finance an ever larger deficit. If every extra percentage point of income pulls in imports faster than world demand pulls out exports, the economy meets an external ceiling well before it runs out of labor or capital. Booms are then followed by forced stabilizations, and what looks like repeated policy failure is partly a property of what the country sells and what it buys.

The question matters now because growth has slowed. Real GDP grew by 4.7 percent a year on average over FY1973 - FY2025 but by only 2.7 percent a year over FY2020 - FY2025. Whether Pakistan can return to growth of 5 or 6 percent without setting off another external crisis is the central policy question, and it is the question this framework was built to answer.

Figure 1

Five Decades of Stop and Go: Real GDP Growth and IMF Arrangements, FY1973–FY2025



Note. Real GDP growth is the annual change in GDP at constant 2015–16 prices (World Bank, 2026). The dashed line is the FY1973–FY2025 average. An IMF arrangement is counted as in force in a fiscal year (July–June) if it was active for any part of that year; dates are from the IMF's history of lending commitments, with the 2023 and 2024 approval dates as stated in the text.

1.2 | Five Facts from the Data

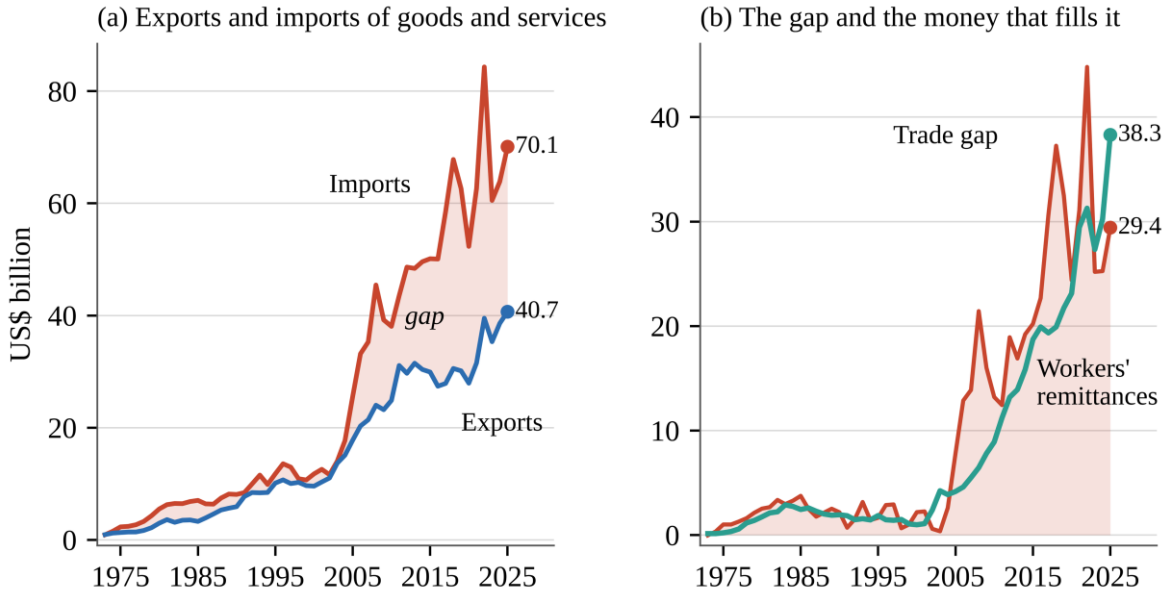
Five facts stand out from the dataset, and each of them shapes the tests that follow.

Growth has slowed and become more fragile. Average growth fell from 6.9 percent in the 1980s to about 4 percent in the 1990s and the 2010s, and to 2.7 percent in FY2020–FY2025 (Table 1). The only two years of falling output in the sample, FY2020 and FY2023, both lie in the last six years. Growth averaged 4.5 percent in the 40 years with a Fund arrangement in force and 5.3 percent in the other 13. This is a description and not an effect: countries enter programs in bad times.

Exports have almost never paid for imports. Exports of goods and services rose from US$0.9 billion in FY1973 to US$40.7 billion in FY2025, while imports rose from US$0.9 billion to US$70.1 billion (Figure 2, panel a). Exports covered imports in full only in FY1973. The coverage ratio averaged 66 percent over the period, touched a low of 45 percent in FY2018 and stood at 58 percent in FY2025 (Figure 4).

Figure 2

The Trade Gap and the Remittances That Fill It, FY1973–FY2025



Note. Exports and imports of goods and services in current US dollars (World Bank, 2026, re-collected from Macrotrends on 11 November 2026). The trade gap is imports minus exports. Workers' remittances are fiscal-year totals from the State Bank of Pakistan; the FY2010 - FY2018 totals were checked against the sum of the Bank's monthly figures.

Remittances, not exports, fill the gap. The gap between imports and exports added up to US$537 billion over FY1973 - FY2025. Workers' remittances over the same years came to US$426 billion, or 79 percent of it. Remittances were below US$1 billion in FY2000, US$8.9 billion in FY2010 and US$38.3 billion in FY2025, when they exceeded the trade gap of US$29.4 billion (Figure 2, panel b). The economy's ability to import therefore depends on the earnings of Pakistanis abroad more than on what is produced at home for sale abroad.

Table 1

Growth, Trade Coverage and IMF Arrangements by Period

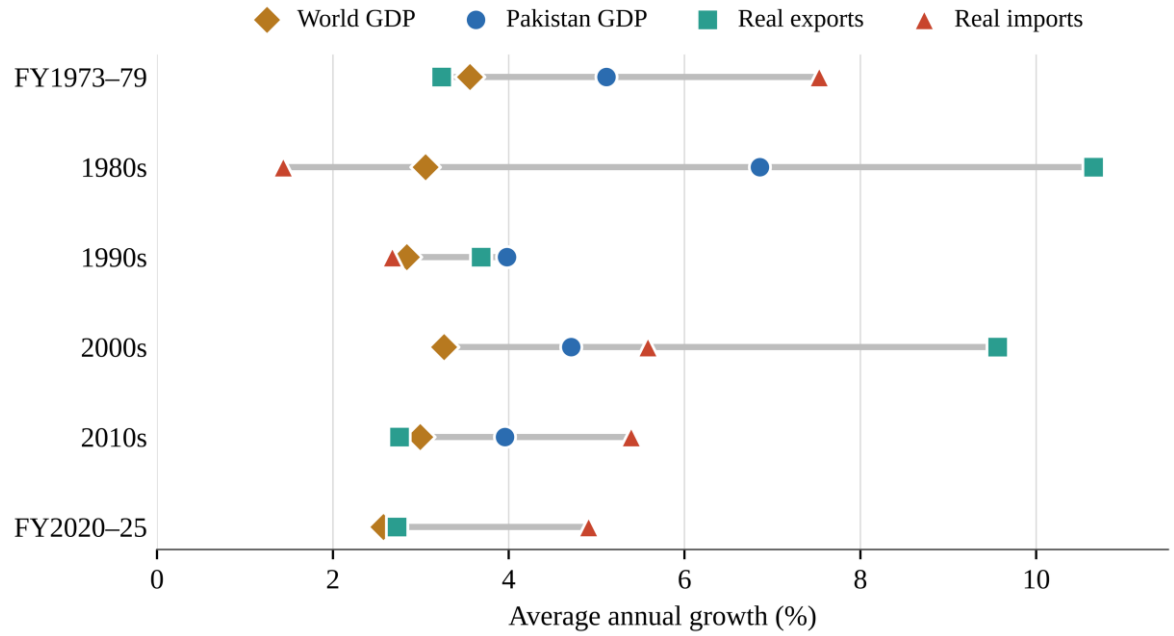
Period	World GDP	GDP	Real exports	Real imports	Exports (world prices)	Imports (world prices)	Export cover (%)	IMF years
FY1973–79	3.6	5.1	3.2	7.5	4.4	18.6	64	6 of 7
1980s	3.1	6.9	10.7	1.4	5.7	2.3	59	5 of 10
1990s	2.8	4.0	3.7	2.7	3.8	1.3	83	9 of 10
2000s	3.3	4.7	9.6	5.6	5.7	11.0	74	7 of 10
2010s	3.0	4.0	2.8	5.4	2.4	4.5	58	7 of 10
FY2020–25	2.6	2.7	2.7	4.9	3.7	1.9	55	6 of 6
Full period	**3.0**	**4.7**	**5.8**	**4.4**	**4.3**	**6.1**	**66**	**40 of 53**

Note. Columns 2 to 7 are average annual growth rates in percent. GDP is Pakistan's real GDP. Real exports and imports are the national-accounts series at constant prices. The world-price series are US dollar values deflated by the world GDP deflator. Export cover is exports of goods and services as a percentage of imports. IMF years are fiscal years with an arrangement in force. Authors' calculations from the dataset described in Section 3.

Import demand outruns export demand in recent decades, and it swings far more than income. In the 2010s real imports grew by 5.4 percent a year and real exports by 2.8 percent, while world income grew by 3.0 percent (Table 1; Figure 3). The 1980s and the 2000s were different: real exports grew by about 10 percent a year in both decades. Imports also amplify the cycle. Annual real import growth ranged from −21 percent to +35 percent, with a standard deviation of 10.9 percentage points against 2.2 for GDP growth (Figure 5).

Figure 3

Average Growth of World Income, Pakistan's Income, Exports and Imports by Period



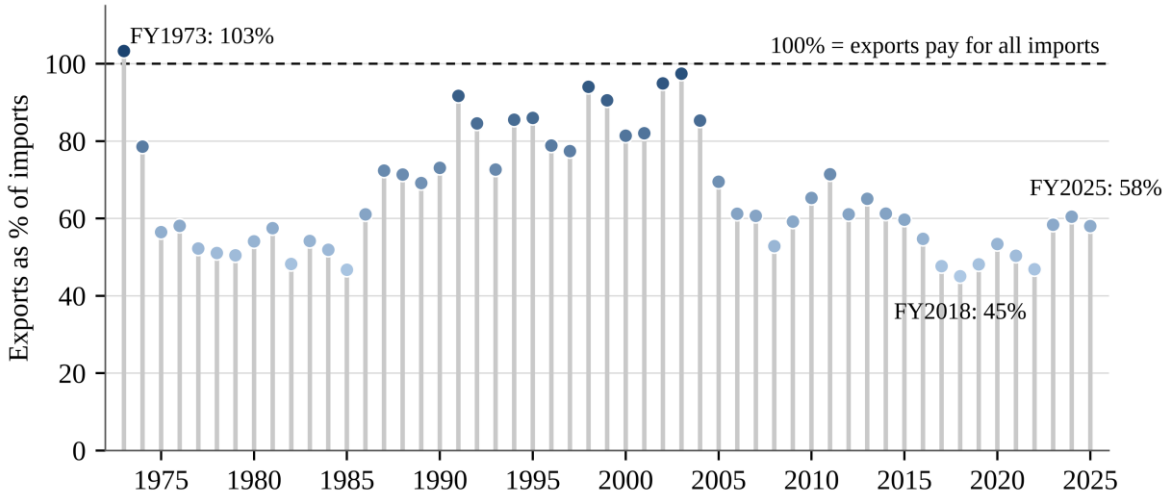
Note. Each row shows the average annual growth rate of four series within a period. The grey bar spans the lowest and highest of the four. Real exports and imports are the national-accounts series at constant prices. Authors' calculations.

One caution belongs here and not in a footnote. The official constant-price accounts record real imports as flat in FY2023, although their dollar value fell by 28 percent. We confirmed that this reading is in the Pakistan Bureau of Statistics series itself and is not an error of collection. We therefore estimate every model

twice, once with the national-accounts volumes and once with dollar values deflated by the world GDP deflator. The choice matters. Over the full period the national-accounts series show exports growing faster than imports (5.8 against 4.4 percent a year), while the world-price series show the reverse (4.3 against 6.1 percent). Both sets of results are reported.

Figure 4

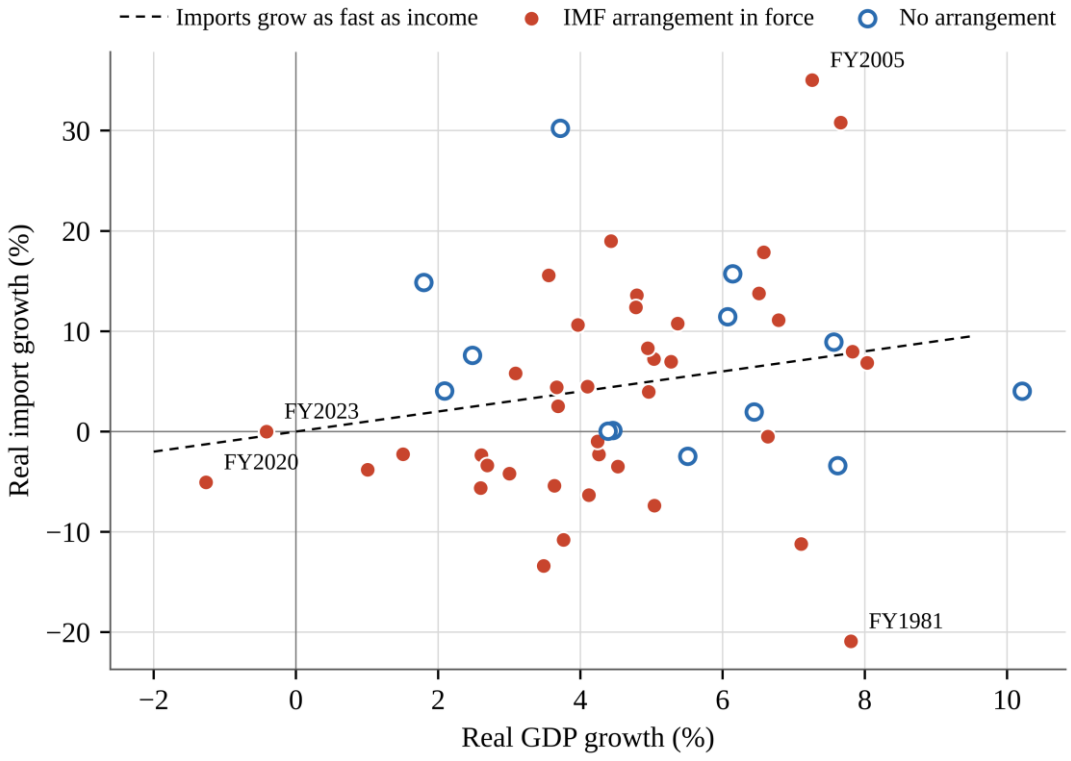
Share of Imports Paid for by Exports, FY1973–FY2025



Note. Exports of goods and services as a percentage of imports of goods and services, both in current US dollars. Darker points indicate higher coverage. Authors' calculations from World Bank (2026).

Figure 5

Import Growth Against Income Growth, FY1973–FY2025

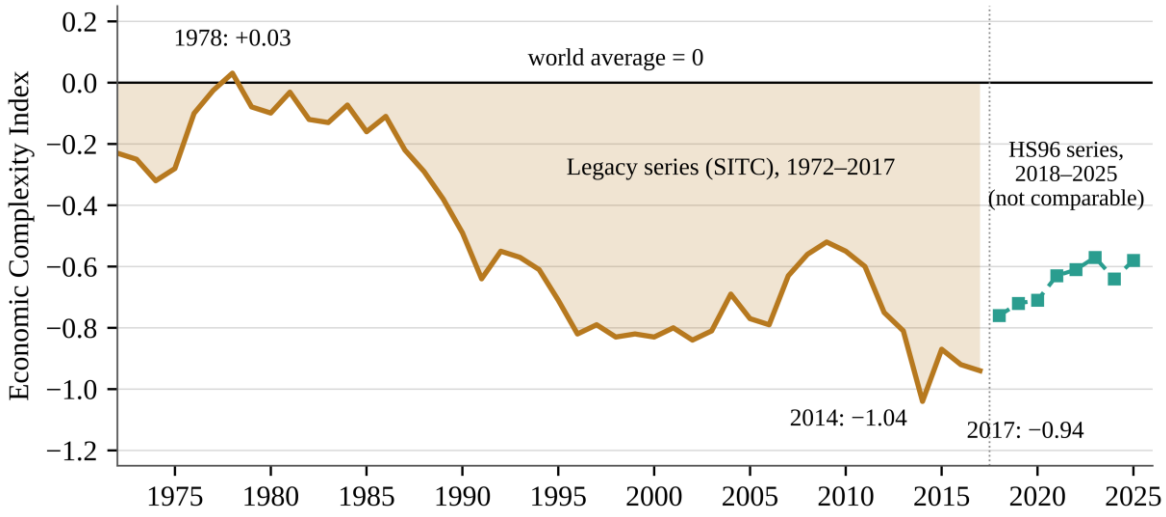


Note. Each point is one fiscal year. Real import growth is the change in imports of goods and services at constant prices. On the dashed line imports grow exactly as fast as income. Authors' calculations.

The export basket has become less complex, not more. The Economic Complexity Index measures how diversified and how sophisticated a country's exports are, with the world average set at zero. Pakistan's index was -0.23 in 1972, rose briefly above zero in 1978 and then fell to -0.83 in 2000 and to a low of -1.04 in 2014 (Figure 6). It was below the world average in 45 of the 46 years covered by the legacy series. A newer series built on a different product classification puts the index at -0.76 in 2018 and -0.58 in 2025. The two series are not comparable, so they are shown separately and are not joined.

Figure 6

Pakistan's Economic Complexity Index, 1972–2025



Note. Legacy series: Observatory of Economic Complexity (2026) ranking based on the SITC classification, 1972-2017. Newer series: the Observatory's HS96-based index, 2018-2025, collected on 11 November 2026. The two use different product classifications and are not spliced.

1.3 | Research Questions and Hypotheses

The paper addresses four questions.

RQ1. Is Pakistan's long-run growth constrained by its balance of payments, in the sense that actual growth stays close to the rate Thirlwall's law predicts?

RQ2. Are the income elasticities of imports and exports stable across policy regimes, and do imports respond differently in fast-growth and slow-growth years?

RQ3. Does export complexity move those elasticities, and with them the growth ceiling?

RQ4. How far have remittances lifted the ceiling, and what combination of export upgrading and financing would be needed to sustain growth of 5 to 6 percent?

Each question is matched to a hypothesis and a test in Table 3 at the end of Section 2.

1.4 | Main Findings and Contribution

Five findings stand out. First, when the income elasticities are held constant over five decades, the bounds tests find no long-run relation in any of the four demand equations; once structural breaks near FY1980 and between FY2003 and FY2005 are allowed for, all four pass the test at the 1 percent level. Second, the income elasticity of export demand roughly halved after FY2005, from 1.29 to 0.67 when exports are valued at constant world prices, and it stands at 0.84 on the volume measure; the import elasticity of the same years lies between 0.79 and 1.17. Third, the growth rate consistent with external balance since FY2005 is 2.9 to 4.0 percent a year, and actual growth of 3.8 percent cannot be distinguished from it. Fourth, on the world-price measure the fall in export complexity is associated with a higher import elasticity and a lower export elasticity, a shift large enough to lower the export-demand ceiling from about 4.8 to 2.2 percent between the complexity levels of FY1973 and FY2017. Fifth, in the long run imports respond far more to income regained in slow-growth years than to income gained in booms, and the foreign exchange that remittances supplied after FY2005 was absorbed by imports rather than converted into faster growth.

The paper makes four contributions. The first is the evidence base. Every series was collected by hand, year by year, tied to a named source and a download date, and the core series were checked against a second official publication; every statistic reported in Section 4 was then reproduced independently from the same data. The second is a dual-measure design that turns a data problem into a finding. Where the official data are doubtful, as with real imports in FY2023, both versions are carried through the analysis, and the comparison shows that in FY1981- FY2004 a ceiling built from export volumes would have overstated the room for growth almost threefold, because the relative price of Pakistan's exports fell by half. The third is the testing strategy: bounds tests that allow for structural breaks and for asymmetric responses, read against decision rules written before any model was estimated, with every departure from the plan reported. The fourth is the link to export structure. The complexity index enters the import and export demand functions directly, which turns the general argument for diversification into a measured effect on the growth ceiling and, in Section 5, into rules that can be monitored.

1.5 | Structure of the Paper

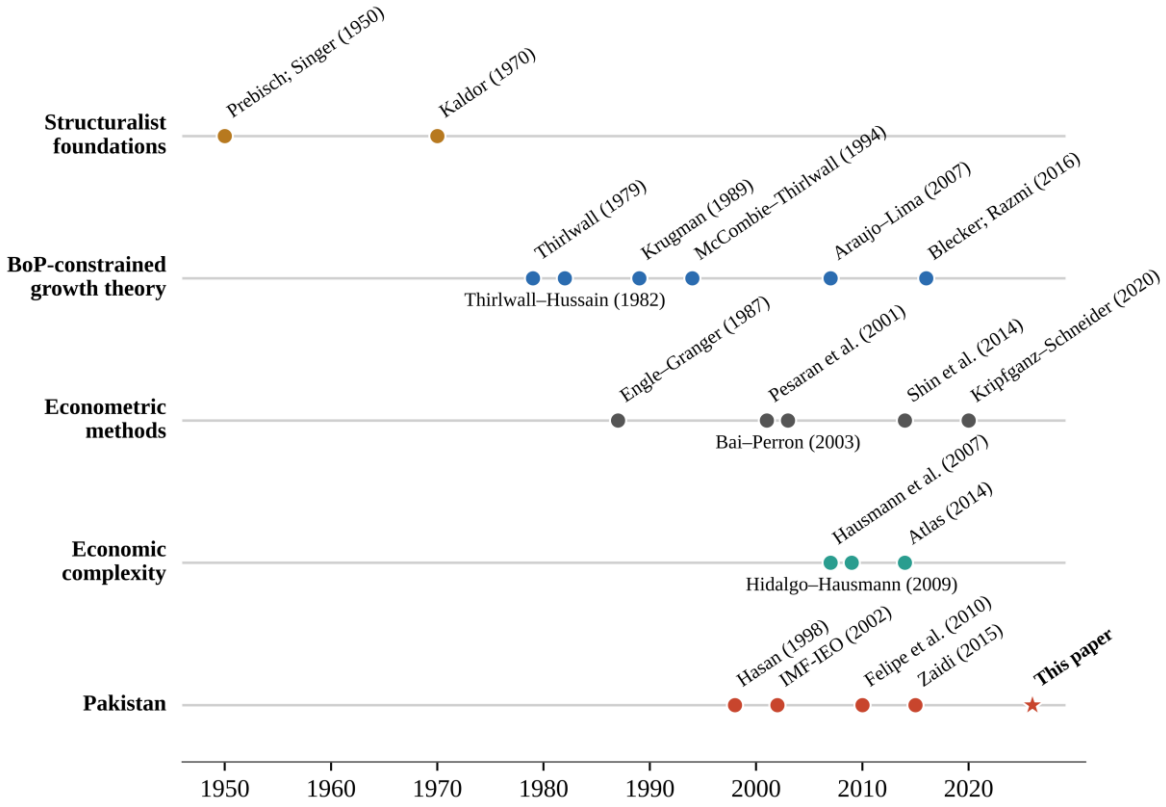
Section 2 reviews the literature and sets out the conceptual framework. Section 3 describes the data and the research methodology, including the decision rules fixed before estimation. Section 4 reports the empirical results, from the order of integration to the growth ceilings and a verdict on each hypothesis. Section 5 turns the estimates into policy simulations and five decision rules. Section 6 concludes. Appendix A maps every reported estimate to its specification and records each departure from the plan of Section 3.

2 | LITERATURE REVIEW

Five bodies of work bear on the question: the structuralist writing on trade and development, the theory of balance-of-payments-constrained growth, the econometrics of long-run relationships, the research on economic complexity, and the studies of Pakistan's own external sector. Figure 7 places the main contributions on a single timeline. The review takes them in turn and then states the gap.

Figure 7

Seven Decades of Literature Behind This Paper



Note. Each point is one of the main contributions cited in this section, placed by year of publication. The star marks the present study.

2.1 | Structuralist Roots

The idea that a developing economy's growth is shaped from outside is old. Prebisch (1950) and Singer (1950) argued that countries selling primary commodities face a low income elasticity of demand for their exports and a long-run fall in their terms of trade against the manufactures they buy. As incomes rise, the import bill then grows faster than export revenue unless the export structure changes. Kaldor (1970) added a dynamic element. Export growth raises productivity through scale and learning, which supports further export growth, so that early differences in competitiveness widen over time. Rodrik (2016) has since shown that many developing countries now see manufacturing peak at much lower income levels than earlier industrialisers did, which narrows the traditional route to a more sophisticated export basket.

2.2 | Thirlwall's Law and Its Extensions

Thirlwall (1979) turned these ideas into a single testable equation. Suppose trade must balance in the long run and relative prices do not change much. Let imports grow at $m = \pi g$, where g is domestic income growth and π the income elasticity of demand for imports, and let exports grow at $x = \varepsilon z$, where z is world income growth and ε the income elasticity of demand for exports. Balance then requires

$$gB = x / \pi = \varepsilon z / \pi \tag{1}$$

Equation 1 says that the growth rate consistent with external balance equals export growth divided by the income elasticity of imports. McCombie and Thirlwall (1994) give the standard treatment, including the version with relative prices:

$$g_B = [(1 + \eta + \psi)(p_d - p_f - e) + \varepsilon z] / \pi \quad (2)$$

Here η and ψ are the price elasticities of export and import demand, and p_d, p_f and e are the growth rates of domestic prices, foreign prices and the nominal exchange rate. A real depreciation relaxes the constraint when the Marshall–Lerner condition holds, but a currency cannot depreciate in real terms for ever, which is why the income terms dominate over long periods (McCombie, 1997). Krugman (1989) reached the same relation between growth rates and the ratio of income elasticities from a different starting point and called it the 45-degree rule.

Thirlwall and Hussain (1982) extended the law to developing countries that run deficits financed by capital inflows. With constant relative prices the constraint becomes

$$g_{TH} = [\theta x + (1 - \theta)(f - p_d)] / \pi \quad (3)$$

where θ is the share of the import bill paid for by exports and $(f - p_d)$ is the real growth of the inflows that pay for the rest. Inflows allow growth above g_B only for as long as they themselves keep growing in real terms. For Pakistan the relevant inflow is remittances, and Equation 3 is the basis for the fourth research question. The most important later development is the multi-sector version of the law. Araujo and Lima (2007) show that the aggregate elasticities are weighted averages of sector elasticities, so a change in what a country produces changes π and ε even if no single sector's elasticity moves. Gouvêa and Lima (2010) and Romero and McCombie (2016) confirm this with sector and product data, and Thirlwall (2011) surveys the whole family of models.

2.3 | Criticisms and What They Mean for Testing

The law has been challenged on three grounds, and each has a consequence for how it should be tested. The first is that Equation 1 may be close to an accounting identity: if trade is roughly balanced, import growth must equal export growth, and the test has little power. The answer in the literature is to estimate π from an import demand function and not to infer it from the trade data alone, which is the approach taken here (McCombie, 1997). The second is direction of causality. Krugman (1989) read the same equation as running from supply-side growth to the elasticities. A country that grows quickly widens the range of goods it sells, and its measured export elasticity rises. The complexity variable used in this paper speaks to exactly this point, because it measures the range and sophistication of the export basket directly. The third concerns the closure of the model. Razmi (2016) and Blecker (2016) argue that relative prices, the size of the country and the treatment of capital flows must be handled with care, and that the law should be seen as a long-run tendency and not a year-by-year prediction. We therefore test long-run relations, report the role of relative prices as a robustness check and treat short-run deviations as part of the cycle.

2.4 | Empirical Evidence and Econometric Methods

Thirlwall's first tests on advanced economies found predicted and actual growth rates to be close. Work on developing countries is more mixed but broadly supportive. Bairam and Dempster (1991) report results for Asian economies in line with the law, Perraton (2003) finds that it holds in a majority of a large sample of developing countries, and Moreno-Brid (1999) applies cointegration methods to Mexico, where import liberalisation raised the import elasticity and lowered the ceiling. Before this literature, Khan (1974) had estimated import and export demand functions for developing countries, and those functions remain the building blocks of every test.

The tools for estimating long-run elasticities have improved a great deal. Engle and Granger (1987) established the idea of cointegration. The ARDL bounds test of Pesaran et al. (2001) made it possible to test for a long-run relation among series that are a mix of stationary and non-stationary, which is the usual case for trade data that span several policy regimes, and Narayan (2005) and Kripfganz and Schneider (2020) supply critical values suited to samples of about 50 observations. The nonlinear ARDL of Shin et al. (2014) lets positive and negative changes in a regressor have different long-run effects, which matters when imports rise quickly in booms and are cut by decree in slumps. Bai and Perron (2003) provide tests that locate structural breaks from the data without the date being imposed. All four are used in this paper.

2.5 | Economic Complexity and the Structure of Exports

A separate literature holds that what a country exports matters for how fast it can grow. Hausmann et al. (2007) show that countries whose exports resemble those of richer countries grow faster afterwards. Hidalgo et al. (2007) describe a product space in which countries move into goods close to those they already make, so that today's export mix limits tomorrow's options. Hidalgo and Hausmann (2009) build the Economic Complexity Index from the diversity of a country's exports and the number of other countries able to make the same goods, and Hausmann et al. (2014) document it for most of the world. Later work links complexity to lower income inequality (Hartmann et al., 2017). Gala et al. (2018) argue that complexity indices give empirical content to the structuralist concern with productive structure, and Romero and McCombie (2018) show that the income elasticities of export and import demand are themselves partly determined by non-price competitiveness.

The connection to the balance-of-payments constraint has been argued more often than it has been tested. A more complex export basket should face a higher income elasticity of demand, because sophisticated goods are less like commodities. A more diversified production structure should lower the import elasticity, because more inputs and capital goods can be bought at home. The multi-sector results of Araujo and Lima (2007) give the formal bridge: aggregate elasticities depend on composition. Yet complexity indices have seldom been placed inside time-series estimates of the Thirlwall rate for a single developing country, and we have found no such study for Pakistan.

2.6 | Studies of Pakistan

Research on Pakistan's external sector has mostly treated its parts one at a time. The study closest to this one is Felipe et al. (2010), who apply Thirlwall's law to Pakistan and put the balance-of-payments-constrained

growth rate at about 5 percent a year, below the official growth targets of the time. Their sample ends in the 2000s, before the remittance boom, the three most recent Fund programmes and the availability of a long complexity series. Two later studies narrow the gap. Khan et al. (2016) estimate an import demand function for 1981–2010 with ARDL and rolling regressions and find that the income elasticity of imports rose after trade liberalisation, tightening the external constraint. Raza (2021), in a State Bank of Pakistan working paper, concludes from ARDL estimates that growth is at least partly balance-of-payments constrained and traces the constraint to a primary export structure, relatively inelastic import demand and falling terms of trade. The general histories of the economy by Hasan (1998), Husain (1999) and Zaidi (2015) describe the repeated resort to external finance and the policy cycles that go with it. The Fund's Independent Evaluation Office (2002) records how conditions attached to successive arrangements were left unmet or reversed. More recent institutional work points to the same structural weakness: a survey from the Pakistan Institute of Development Economics (2025) reviews the reasons for weak export performance, and the World Bank (2025) identifies tariffs, energy costs and logistics as the main barriers to exporting.

2.7 | The Gap and the Conceptual Framework

Table 2 sets the five strands side by side. What is missing is a single study that estimates Pakistan's income elasticities over the whole post-1972 period with current methods, allows them to shift across regimes and between booms and slumps, relates them to a measure of export sophistication, and uses data whose every series can be traced to its source.

Table 2

Strands of the Literature and the Gap Addressed

Strand	Main contributions	Typical limitation	What this paper adds
Structuralist roots	Prebisch (1950); Singer (1950); Kaldor (1970)	Largely conceptual	A measured ceiling for Pakistan
Constrained-growth theory	Thirlwall (1979); Thirlwall and Hussain (1982); McCombie and Thirlwall (1994); Araujo and Lima (2007); Romero and McCombie (2018)	Elasticities often assumed constant	Elasticities that vary by regime and by phase of the cycle
Econometric methods	Pesaran et al. (2001); Bai and Perron (2003); Shin et al. (2014)	Seldom combined in one study	Bounds tests with breaks and asymmetry, on two measures of trade
Economic complexity	Hausmann et al. (2007); Hidalgo and Hausmann (2009); Gala et al. (2018)	Focus on income, not on the external ceiling	Complexity inside the import and export functions
Pakistan	Felipe et al. (2010); Khan et al. (2016); Raza (2021); Hasan (1998); Zaidi (2015); IMF Independent Evaluation Office (2002)	Breaks, asymmetry and export structure not tested together, or the treatment is qualitative	FY1973–FY2025, with remittances and decision rules

Note. Authors' synthesis of the works cited in Section 2.

The framework that organises the empirical work is shown in Figure 8. A boom, set off by easier policy or by a window of external inflows, raises import demand. With a narrow export base, exports lag behind. The current account widens and reserves fall. A crisis follows, a Fund arrangement is agreed, and imports are

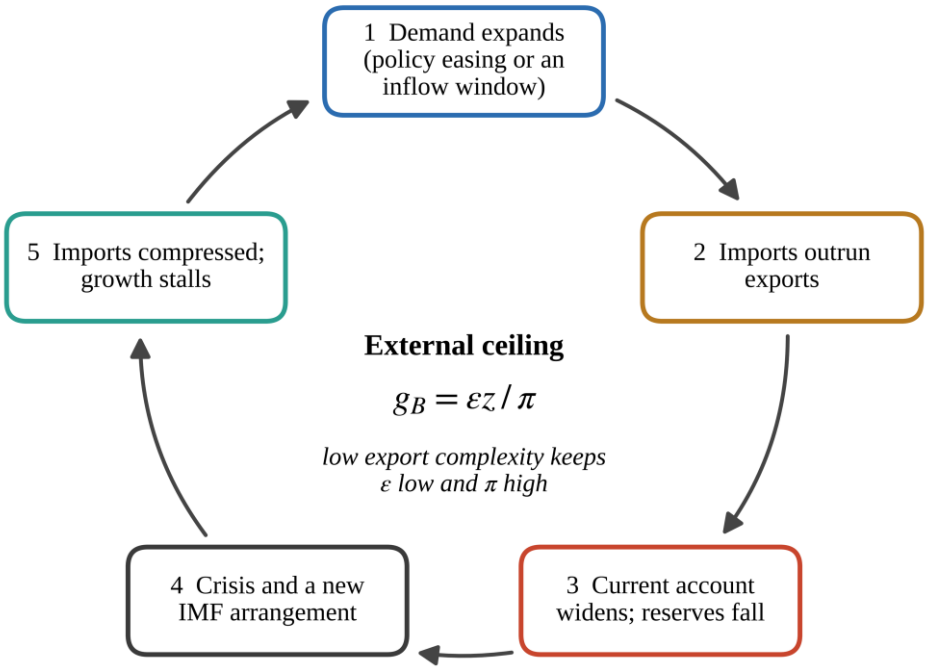
compressed until the accounts balance at a lower rate of growth. Reserves are rebuilt and the cycle is ready to start again. The ceiling in the middle of the figure is set by the ratio of the two elasticities, and the hypothesis of this paper is that both depend on the complexity of exports, C:

$$g_B(C) = \varepsilon(C)\, z \,/\, \pi(C), \quad \text{with } \partial\varepsilon/\partial C > 0 \text{ and } \partial\pi/\partial C < 0 \tag{4}$$

If Equation 4 holds, a more complex export basket pays twice: it raises the numerator of the ceiling and lowers the denominator. Table 3 sets out the hypotheses that follow and the tests that Sections 3 and 4 apply to them.

Figure 8

The Stop-Go Cycle and the External Ceiling



Note. Authors' schematic of the mechanism tested in Sections 3 to 5. g_B is the growth rate consistent with external balance, ε the income elasticity of export demand, z world income growth and π the income elasticity of import demand.

Table 3

Research Questions, Hypotheses and Planned Tests

	Hypothesis	Planned test	Use for policy
H1	Long-run growth is constrained by the balance of payments: actual growth is close to g_B.	ARDL bounds tests on import and export demand; comparison of g_B with actual growth	An external speed limit for growth targets
H2	The elasticities differ across regimes, and imports respond more strongly in fast-growth years.	Bai–Perron break tests; nonlinear ARDL with a test of symmetry	Early-warning signals for when the constraint binds
H3	Higher export complexity raises ε and lowers π.	Complexity interaction terms on the 1973–2017 sample	Priority for export upgrading over general export promotion
H4	Remittances raise the ceiling only while they keep growing in real terms.	Thirlwall–Hussain rate from Equation 3 with fiscal-year remittances	Sizing the growth that remittances can support; sequencing exit from Fund support

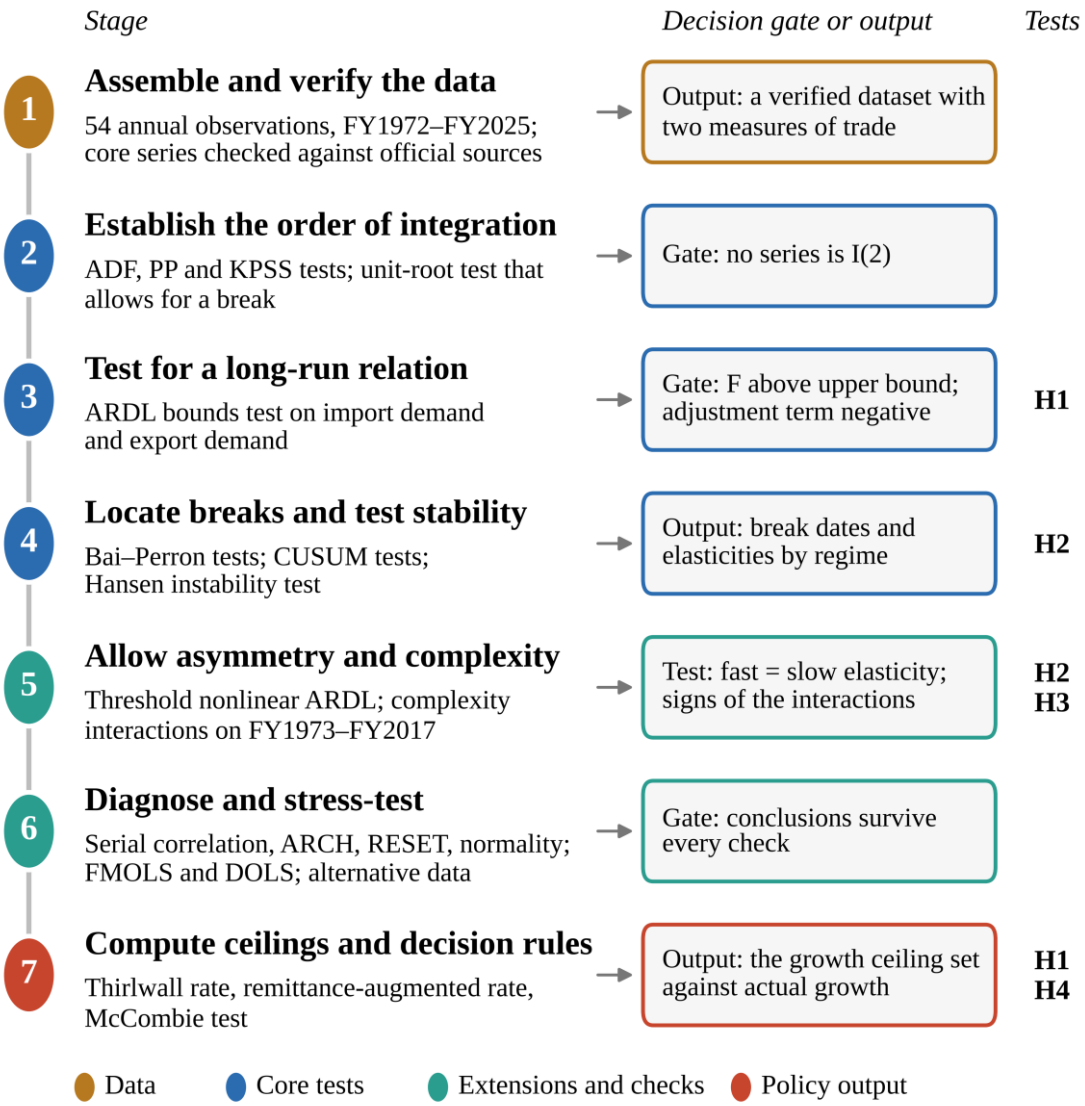
Note. Results for each hypothesis are reported in Section 4.

3 | DATA AND RESEARCH METHODOLOGY

This section sets out the data, the models and the order in which the tests are run. The rules by which each result will be read are stated here, before the results, so that Section 4 can be judged against standards that were not chosen after the estimates were seen. Figure 9 gives the sequence at a glance: seven stages, each ending in a decision gate or an output, with the hypothesis that the stage tests.

Figure 9

Research Design: Seven Stages From Data to Decision Rules



Note. Authors' design. A gate is a condition that must hold before the next stage is run; an output is carried forward to later stages. The last column shows the hypotheses of Table 3 that each stage tests.

3.1 | Research Design

The study is a single-country time-series analysis. Its hypotheses are derived from theory in Section 2 and tested on annual data for Pakistan's fiscal years 1973 to 2025. Two features of the design deserve notice at the start. The first is double measurement. Because the official volume of imports is doubtful in at least one year, every trade equation is estimated on two measures of trade, and a conclusion is treated as firm only where both measures agree. The second is that the decision rules are fixed in advance. Section 3.7 states, for each hypothesis, what result will count as support and what result will count against it.

3.2 | Data and Variables

The dataset has 54 annual observations, from FY1972 to FY2025, where FY2025 is the fiscal year that ran from July 2024 to June 2025. FY1972 serves as the base for growth rates. World income and the world-

price trade series need the preceding calendar year and so begin in FY1973, which makes the estimation sample FY1973–FY2025, or 53 observations. Table 4 lists the variables, their units and their sources.

Table 4

Variables, Definitions and Sources

Symbol	Variable and unit	Name in the data file	Source and construction
Y	Real GDP, PKR trillion at constant 2015–16 prices	GDP_RC	World Bank (2026), indicator NY.GDP.MKTP.KN
M	Imports of goods and services, US$ billion at constant 2015 prices	M_REAL	World Bank (2026), indicator NE.IMP.GNFS.KD
X	Exports of goods and services, US$ billion at constant 2015 prices	X_REAL	World Bank (2026) national accounts data, collected through Our World in Data
Z	World real GDP, US$ billion at constant 2015 prices, aligned to Pakistan's fiscal year	WGDP_K_FY	World Bank (2026), collected through StatisticsTimes; geometric mean of calendar years $t-1$ and t
M^{w}, X^{w}	Imports and exports of goods and services at constant world prices, US$ billion	M_RW, X_RW	Current-dollar values (World Bank, 2026, collected through Macrotrends) divided by the world GDP deflator, 2015 = 1
Q	Real exchange rate index, 2015 = 100; a rise is a real depreciation of the rupee	RER_FY	Rupees per dollar multiplied by the US consumer price index and divided by Pakistan's (World Bank, 2026; Federal Reserve Bank of Minneapolis, 2026); mean of calendar years $t-1$ and t
C	Economic Complexity Index, FY1973–FY2017; world average = 0	ECI_FY	Observatory of Economic Complexity (2026), legacy series; mean of calendar years $t-1$ and t
R	Workers' remittances, US$ billion, fiscal-year totals	REMIT_FY	State Bank of Pakistan (n.d.) and Finance Division (2025)
D^{IMF}	Equals 1 if an IMF arrangement was in force in the fiscal year	IMF_ACT_FY	International Monetary Fund (n.d.)
X^{n}, M^{n}	Exports and imports of goods and services, current US$ billion	X_GS_USD, M_GS_USD	World Bank (2026), collected through Macrotrends

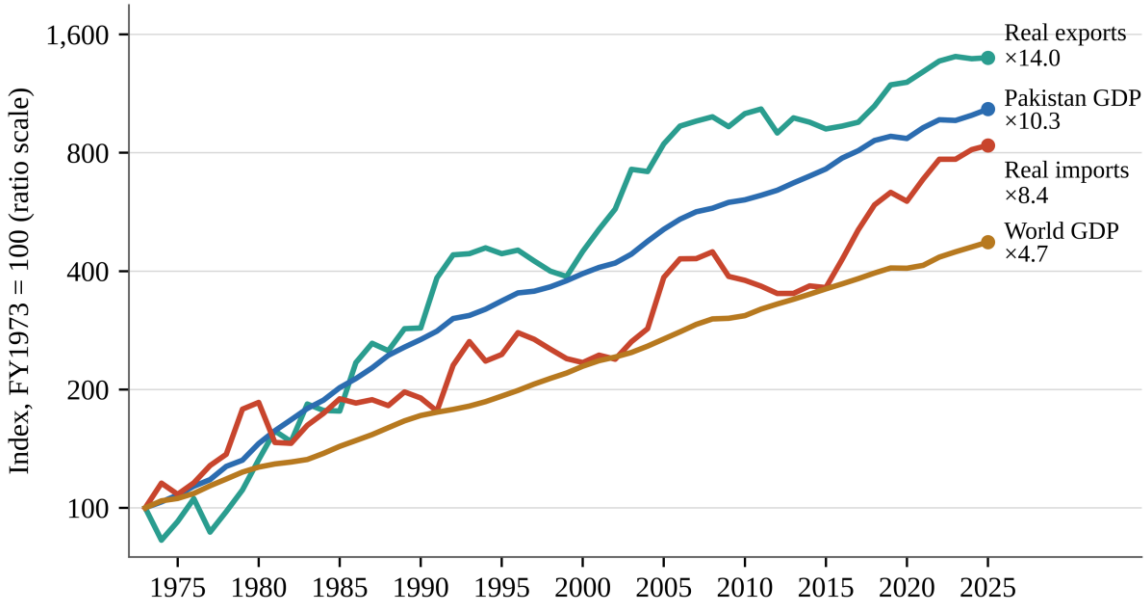
Note. All series are annual. Pakistan's national accounts, trade and remittance data follow the fiscal year (July to June). Series published by calendar year are aligned to the fiscal year by averaging the two calendar years that the fiscal year spans.

Three points of construction need explanation. First, Pakistan's accounts follow the fiscal year while world income, prices and the complexity index are published by calendar year. Each calendar-year series is aligned by averaging the two calendar years that a fiscal year spans, with a geometric mean for levels that grow and an arithmetic mean for indices. Second, the real exchange rate built in this way is an approximation and not an official series, which is one reason it enters as a check and not as part of the baseline (Section 3.4). Third, the complexity index is used only to FY2017. The series that begins in 2018 rests on a different product classification, and no years of overlap were available to test whether the two can be joined.

Figure 10 plots the four core series as indices on a ratio scale, on which a constant growth rate appears as a straight line. Between FY1973 and FY2025 real exports rose 14.0-fold, real GDP 10.3-fold, real imports 8.4-fold and world income 4.7-fold. All four trend upward throughout, which is why the first step of the estimation is to establish their order of integration.

Figure 10

The Four Core Series, FY1973–FY2025



Note. Each series is divided by its FY1973 value and multiplied by 100. The vertical axis is a ratio scale. The multiples at the right give FY2025 relative to FY1973. Authors' calculations from the sources in Table 4.

3.3 | Verification of the Data

Each core series was checked against a source other than the one from which it was collected. Table 5 reports the checks and Figure 11 shows three of them. A point on the dashed line in Figure 11 is a year in which the dataset and the official source agree exactly.

Table 5

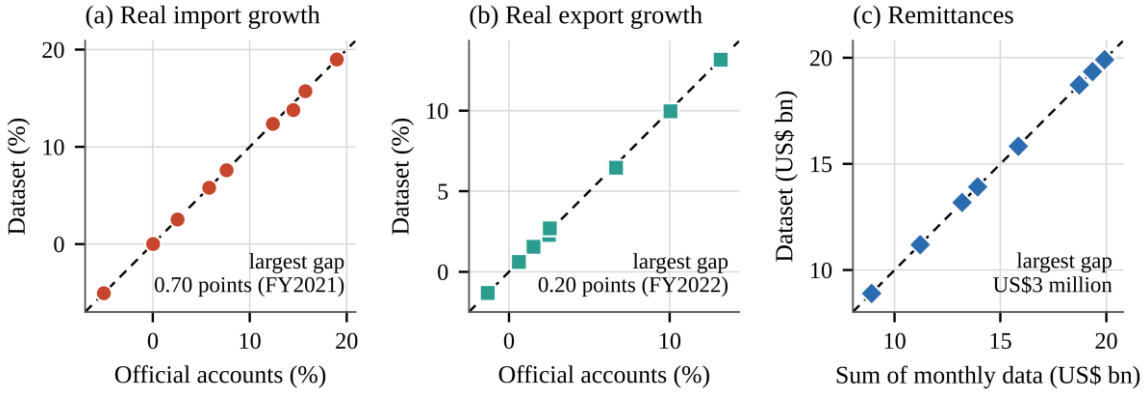
Verification Checks and Their Results

Series	Check	Result
Exports and imports, current dollars	Full series collected a second time on 11 November 2026	All 54 years agree; one value (imports, FY1973) differed by US$0.01 billion and was set to the later download
Real imports	Growth compared with the expenditure accounts at constant 2015–16 prices, FY2017–FY2025 (Finance Division, 2022, 2025; State Bank of Pakistan, 2022, 2025b)	Within 0.01 percentage point in eight of nine years; 0.70 point in FY2021, where two vintages of the accounts meet
Real exports	Same comparison, FY2017–FY2025	Within 0.20 percentage point in all nine years
Workers' remittances	FY2010–FY2018 totals compared with the sum of monthly figures (State Bank of Pakistan, n.d.)	Within US$3 million in every year
Real GDP	Eleven years compared with a separate extraction of the same indicator; growth implied by the levels compared with published growth in every year	All eleven agree. One transcription error (FY1974) was found and corrected. In ten other years the two growth rates differ by more than one percentage point
IMF arrangements	Dates compared with the Fund's lending history (International Monetary Fund, n.d.)	An arrangement in force in 40 of 53 fiscal years

Note. The ten years in which level-implied and published GDP growth differ by more than one percentage point reflect different vintages and base years of the national accounts. The sensitivity of the results to this difference is tested in Section 3.8.

Figure 11

The Dataset Against Official Sources



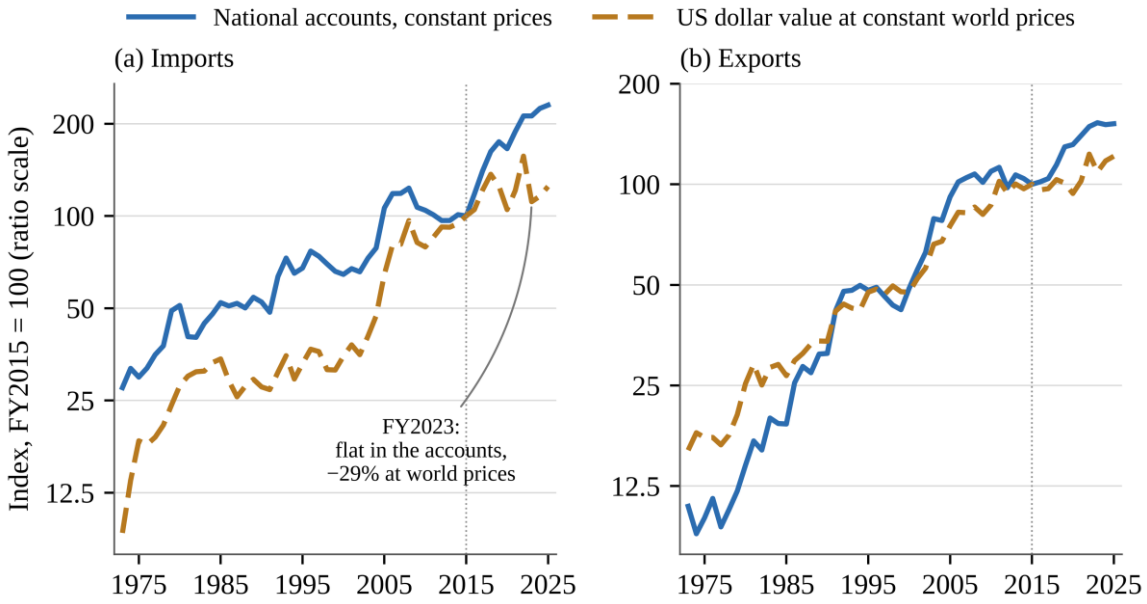
Note. Panels (a) and (b): annual growth of real imports and exports in the dataset against growth in the official expenditure accounts at constant 2015–16 prices, FY2017–FY2025. Panel (c): fiscal-year remittances in the dataset against the sum of the State Bank's monthly figures, FY2010–FY2018. Points on the dashed line agree exactly.

The checks also brought two anomalies to light, and both lie in the official accounts and not in the collection of the data. The constant-price accounts record real imports as unchanged in FY2023, a year in which their dollar value fell by 28 percent. They also record real exports as rising by 13.2 percent in FY2019, a year in which their dollar value fell by 1.4 percent. A model estimated only on these volumes would inherit both readings.

For that reason a second measure of trade is carried through the whole analysis. It takes the dollar value of exports and of imports and divides each by the world GDP deflator. The two measures answer slightly different questions. The national-accounts series measure quantities at base-year prices. The world-price series measure what trade earns and costs in foreign exchange of constant purchasing power, and so they also move when the terms of trade move. Figure 12 compares them. For exports the two run close together. For imports they part company in the 1970s, when the oil shocks raised the import bill much faster than import volumes, and again in FY2023, when the world-price series fell by 29 percent while the accounts show no change. Since the balance-of-payments constraint is a constraint on foreign exchange, neither measure can be set aside, and both are reported.

Figure 12

Two Measures of Trade Volume, FY1973–FY2025



Note. Both measures are indices with FY2015 = 100, plotted on a ratio scale. National accounts: imports and exports of goods and services at constant prices. Constant world prices: current-dollar values divided by the world GDP deflator. Authors' calculations.

3.4 | Model Specification

The building blocks are the import and export demand functions that underlie Equation 1. In logarithms,

$$\ln M_t = \alpha_0 + \pi \ln Y_t + \psi \ln Q_t + u_t \tag{5}$$

$$\ln X_t = \beta_0 + \varepsilon \ln Z_t + \eta \ln Q_t + v_t \tag{6}$$

where π and ε are the income elasticities of import and export demand, ψ and η are the responses to the real exchange rate, and u_t and v_t are errors. Theory gives the expected signs: $\pi > 0$ and $\varepsilon > 0$, and, because a rise in Q is a real depreciation, $\psi < 0$ and $\eta > 0$.

Two specifications are estimated for each equation. Specification A sets $\psi = \eta = 0$ and is the baseline. It is the form in which Thirlwall's law is stated, it keeps the number of parameters small in a sample of 53 observations, and it does not depend on a relative-price series that is itself an approximation. Specification B adds the real exchange rate. If the real exchange rate is significant at the 5 percent level in the long-run relation of Specification B, that specification becomes the preferred model for the equation concerned. If it is not, Specification A is kept and the result of B is reported beside it. Each specification is estimated on both measures of trade, which gives four import equations and four export equations in all.

3.5 | Estimation Strategy

The estimation follows stages 2 to 6 of Figure 9. Table 6, at the end of this subsection, summarises each stage and the way its result is read.

Order of Integration

Each series is tested in levels and in first differences with the augmented Dickey–Fuller test (Dickey & Fuller, 1979) and the Phillips–Perron test (Phillips & Perron, 1988), whose null hypothesis is a unit root, and with the KPSS test (Kwiatkowski et al., 1992), whose null hypothesis is stationarity. Using tests with opposite null hypotheses guards against a conclusion that rests on the low power of any one of them. Each test is run with an intercept and with an intercept and trend. Because a single break in a stationary series can be mistaken for a unit root (Perron, 1989), the tests are repeated with a unit-root test that allows one break at an unknown date (Vogelsang & Perron, 1998). The purpose of this stage is narrow. The bounds test that follows is valid for series that are stationary, integrated of order one, or a mixture of the two, but not for a series integrated of order two. The gate is therefore that no series is I(2).

Long-Run Relation: The ARDL Bounds Test

The long-run relations are tested and estimated with the autoregressive distributed lag approach of Pesaran and Shin (1999) and Pesaran et al. (2001). It has three advantages here. It does not require all series to have the same order of integration. It has good properties in small samples. And it delivers the long-run elasticity and the short-run dynamics from one equation. For the import function under Specification A the model in error-correction form is

$$\Delta \ln M_t = a_0 + \Sigma_{i=1}^{p-1} \varphi_i \, \Delta \ln M_{t-i} + \Sigma_{j=0}^{q-1} \gamma_j \, \Delta \ln Y_{t-j} + \lambda_1 \ln M_{t-1} + \lambda_2 \ln Y_{t-1} + e_t \tag{7}$$

The null hypothesis of no long-run relation is $\lambda_1 = \lambda_2 = 0$. It is tested with the bounds F statistic and, as a second test, with the t statistic on λ_1 (Banerjee et al., 1998; Pesaran et al., 2001). When the null is rejected, the long-run income elasticity is

$$\pi = -\lambda_2 / \lambda_1 \tag{8}$$

and λ_1 measures the share of any gap between imports and their long-run level that is closed within a year. It should be negative and significant. The export function is treated in the same way, with X in place of M and Z in place of Y. Lag lengths p and q are chosen by the Akaike criterion from a maximum of three years, which absorbs the dynamics of annual data while leaving at least 40 degrees of freedom. The intercept is unrestricted and no trend is included. Because the sample is small, inference rests on the finite-sample critical values of Narayan (2005), in line with the finding of Kripfganz and Schneider (2020) that asymptotic bounds can mislead in samples of this size. The asymptotic values of Pesaran et al. (2001) are reported beside them. The long-run elasticities are also estimated by fully modified least squares (Phillips & Hansen, 1990) and dynamic least squares (Stock & Watson, 1993), so that the result does not depend on one estimator.

Structural Breaks and Parameter Stability

A sample of 53 years covers trade liberalisation, the surge in remittances after 2001, the crisis of 2008 and the move to a market-determined exchange rate in 2019. An elasticity assumed constant across all of them may be an average of several different ones, and a test for a long-run relation loses power when a shift in that relation is ignored (Gregory & Hansen, 1996). Break dates are therefore located from the data with the sequential procedure of Bai and Perron (1998, 2003), applied to the long-run equation with 15 percent

trimming, which sets the shortest regime at about eight years, and a maximum of three breaks. With K breaks at dates T_1 to T_K, the long-run import function becomes

$$\ln M_t = \alpha_0 + \Sigma_{k=1}^{K} \alpha_k D_{kt} + \pi_0 \ln Y_t + \Sigma_{k=1}^{K} \pi_k (D_{kt} \times \ln Y_t) + u_t \quad (9)$$

where D_{kt} equals one from year T_k onward. The income elasticity in the regime that follows break k is the sum of π_0 and the shift terms up to π_k. Since the regressors are trending, the Bai–Perron statistics are used to date the breaks and not as the final evidence that they matter (Kejriwal & Perron, 2010). That evidence comes from three further tests: the joint significance of the break terms inside the ARDL model, the CUSUM and CUSUM-of-squares tests on its recursive residuals (Brown et al., 1975), and the instability test of Hansen (1992), which is designed for cointegrating regressions. The standard bounds are derived for models without breaks. In a model with break terms the bounds test is therefore read conservatively: a long-run relation is accepted only if the F statistic exceeds the upper bound at the 1 percent level and the adjustment coefficient is significant.

Asymmetry: A Threshold Nonlinear ARDL

The second hypothesis holds that imports respond more strongly to income in fast-growth years than in slow ones. The nonlinear ARDL model of Shin et al. (2014) tests such a claim by splitting a regressor into the sum of its increases and the sum of its decreases. That split cannot be used here, because output fell in only two of the 53 years. Income growth is instead split at its median, following the threshold version of the model (Pal & Mitra, 2016). Writing y_t for $\ln Y_t$, and τ for the median of Δy_t,

$$y^{H}_{t} = \Sigma_{j=1973}^{t} \Delta y_j \cdot 1[\Delta y_j > \tau], \quad y^{L}_{t} = \Sigma_{j=1973}^{t} \Delta y_j \cdot 1[\Delta y_j \leq \tau] \quad (10)$$

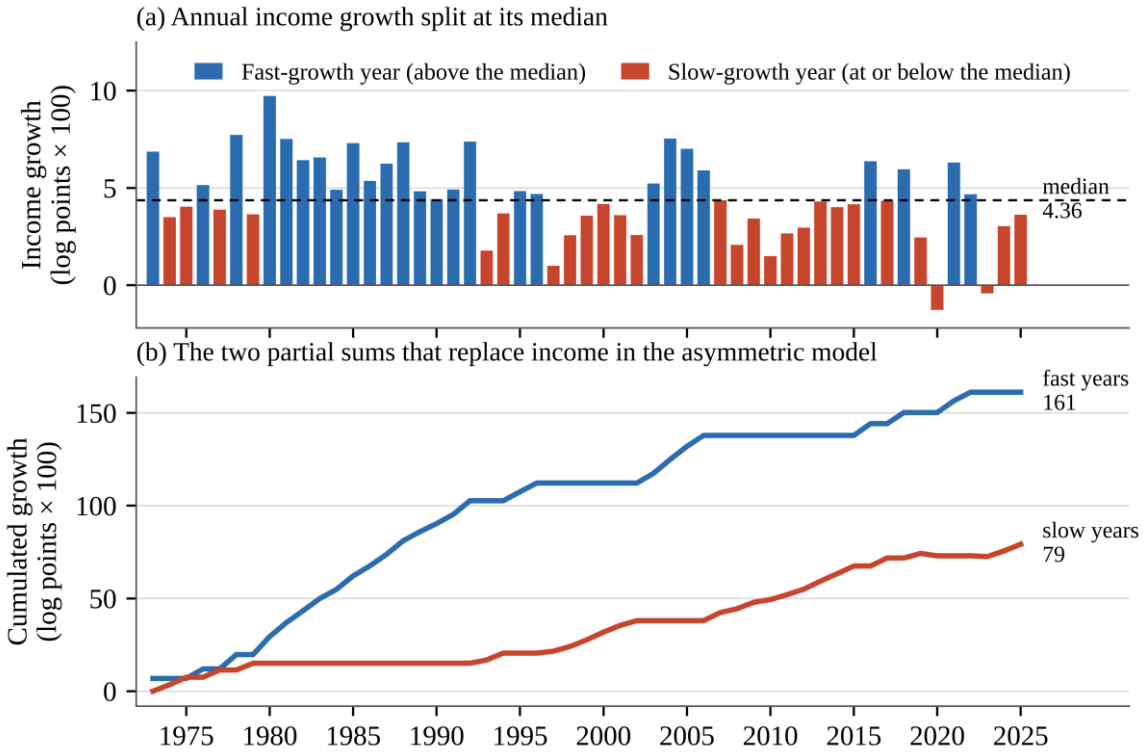
where $1[\cdot]$ equals one when the condition in brackets holds and zero otherwise. The two partial sums add up to the whole change in income since FY1972, so nothing is lost by the split. The median is 4.36 log points, which places 26 years in the fast group and 27 in the slow group. Figure 13 shows the split and the two partial sums. They replace income in the import function:

$$\ln M_t = \alpha_0 + \pi^{H} y^{H}_{t} + \pi^{L} y^{L}_{t} + u_t \quad (11)$$

Equation 11 is estimated as an ARDL model in the same way as Equation 7, and symmetry is tested with a Wald test of $\pi^{H} = \pi^{L}$. A finding that π^{H} exceeds π^{L} would mean that income gained in booms draws in more imports than income gained in slow years, which is the mechanism at the second stage of the cycle in Figure 8.

Figure 13

Income Growth Split at Its Median for the Asymmetric Model



Note. Panel (a): annual change in the logarithm of real GDP, multiplied by 100, with years above the median in blue and years at or below it in red. Panel (b): the running totals of the two groups, which are the regressors of Equation 11. Authors' calculations.

Export Complexity

The third hypothesis is tested by letting the income elasticities depend on the complexity of exports:

$$\ln M_t = \alpha_0 + \alpha_1 C_t + \pi_0 \ln Y_t + \pi_1 (C_t \times \ln Y_t) + u_t \tag{12}$$

$$\ln X_t = \beta_0 + \beta_1 C_t + \varepsilon_0 \ln Z_t + \varepsilon_1 (C_t \times \ln Z_t) + v_t \tag{13}$$

The elasticities are then $\pi(C) = \pi_0 + \pi_1 C$ and $\varepsilon(C) = \varepsilon_0 + \varepsilon_1 C$. Because the index is zero at the world average, π_0 and ε_0 are the elasticities of an economy of average complexity, and Equation 4 predicts $\pi_1 < 0$ and $\varepsilon_1 > 0$. These models can be estimated only for FY1973–FY2017, which is 45 observations, and the maximum lag is reduced to two years. With so short a sample the test has limited power, and its result is treated as indicative.

Diagnostic Tests

The baseline models and the break, asymmetry and complexity models are each tested for serial correlation with the Breusch–Godfrey test (Breusch, 1978; Godfrey, 1978), for conditional heteroskedasticity with the ARCH test (Engle, 1982), for functional form with the RESET test (Ramsey, 1969) and for normality of the residuals with the Jarque–Bera test (Jarque & Bera, 1987). The ARDL models estimated for the robustness checks of Section 3.8 are tested for serial correlation only, since that is the condition on which the bounds test depends. Serial correlation invalidates the bounds test, so a model that fails that test is re-specified

with a longer lag and is not reported in its failed form. Failures of the other tests are reported, and where heteroskedasticity is found the standard errors are replaced by those of Newey and West (1987).

Table 6

Estimation Sequence and How Each Result Is Read

Stage	Purpose	Method	How the result is read
1	Assemble and verify the data	Collection by hand; the cross-checks of Table 5	A series enters the models only after its check is passed
2	Order of integration	ADF, Phillips–Perron and KPSS tests in levels and differences; unit-root test with one break	Proceed if no series is I(2)
3	Long-run relation	ARDL bounds test, unrestricted intercept, lags by the Akaike criterion up to three; long-run form	*F* above the upper bound at 5 percent: a long-run relation exists. Below the lower bound: none. Between the bounds: decided by the *t* test on the adjustment coefficient
4	Breaks and stability	Bai–Perron sequential tests; CUSUM tests; Hansen instability test	Break dates define regimes; break terms are kept if jointly significant at 5 percent
5	Asymmetry and complexity	Threshold nonlinear ARDL with a Wald test; complexity interactions, FY1973–FY2017	Rejection of equal coefficients at 5 percent indicates asymmetry; sign and significance of the interactions
6	Diagnostics and robustness	Breusch–Godfrey, ARCH, RESET and Jarque–Bera tests; the checks of Table 8	A model is reported only if it passes the serial-correlation test at 5 percent
7	Ceilings and decision rules	Equations 14 to 18	Each ceiling is compared with actual growth, for the full sample and by regime

Note. Stages are those of Figure 9. All tests use the 5 percent level unless stated otherwise.

3.6 | From Elasticities to Growth Ceilings

The estimated elasticities are turned into growth ceilings in three ways. The first, often called the weak form of the law, divides the average growth of real exports, x, by the estimated income elasticity of imports:

$$g_B^{w} = x / \pi \tag{14}$$

The second, the strong form, replaces actual export growth by what world income growth, z, and the estimated export elasticity predict:

$$g_B^{s} = \varepsilon z / \pi \tag{15}$$

The weak form asks whether growth has been consistent with the exports the country actually achieved. The strong form asks what growth the structure of demand for its exports can support. The third ceiling adapts Equation 3 to Pakistan's main source of non-export foreign exchange:

$$g_R = [\theta x + (1 - \theta) r] / \pi \tag{16}$$

where θ is the average share of exports in the sum of exports and workers' remittances and r is the average growth of remittances deflated by the world GDP deflator. Equation 16 is computed on the world-price measure, so that exports and remittances are deflated in the same way. It isolates the part of the ceiling that

remittances have lifted. Borrowing and foreign investment are left out, because fiscal-year series for them could not be verified back to 1973.

Whether actual growth equals the ceiling is tested as proposed by McCombie (1989). Let g be the average growth of real GDP. The import elasticity that would make the ceiling of Equation 14 exactly equal to actual growth is

$$\pi^{*} = x / g \tag{17}$$

and the hypothesis $\pi = \pi^{*}$ is tested with a t test that uses the standard error of the estimated long-run elasticity. If the hypothesis is not rejected, actual growth cannot be distinguished from balance-of-payments-constrained growth. The precision of each ceiling follows from that of the elasticity. For the weak form,

$$\mathrm{se}(g_B^{\mathrm{w}}) = (x / \pi^2) \cdot \mathrm{se}(\pi) \tag{18}$$

All three ceilings are computed for the full sample and, where breaks are found, for each regime.

3.7 | Decision Rules Fixed in Advance

Table 7 states what will count as support for each hypothesis and what will count against it. Two general rules apply to all four. A result must hold on both measures of trade to be called firm. Where the two measures disagree, the hypothesis is reported as supported on one measure only and the disagreement is discussed. It is not settled by choosing the more favourable result.

Table 7

Decision Rules for the Four Hypotheses

	Supported if	Not supported if
H1	The bounds test finds a long-run import relation at 5 percent, the adjustment coefficient is negative and significant, and the McCombie test does not reject $\pi = \pi^{*}$	No long-run relation is found even when breaks are allowed for. If a relation is found but the McCombie test rejects, the constraint exists but growth has departed from it, and the direction of the departure is reported
H2	At least one break is found whose terms are jointly significant at 5 percent in the ARDL model, or the Wald test rejects $\pi^{\mathrm{H}} = \pi^{\mathrm{L}}$ at 5 percent	No significant break is found and symmetry is not rejected
H3	π_1 is negative and ε_1 is positive, each significant at 5 percent on a one-sided test. Support is partial if only one of the two holds	Neither interaction has the predicted sign and significance
H4	The remittance-augmented ceiling g_R lies above g_B^{w} and closer to actual growth than g_B^{w} does	g_R is no higher than g_B^{w}, or lies further from actual growth

Note. Hypotheses are those of Table 3. π^{*} is defined in Equation 17, π^{H} and π^{L} in Equation 11, π_1 and ε_1 in Equations 12 and 13, and the ceilings in Equations 14 and 16.

3.8 | Robustness Checks

Table 8 lists the checks applied to the baseline results. Each changes one element of the baseline and leaves the rest as it was, so that any change in the conclusion can be traced to its cause.

Table 8

Robustness Checks

	Element changed	Alternative	Reason
R1	Measure of trade	Dollar values at constant world prices in place of national-accounts volumes	Official import volumes are doubtful in FY2023 and export volumes in FY2019
R2	Relative prices	Real exchange rate added to each equation (Specification B)	The law assumes that relative prices do not matter in the long run; this tests the assumption
R3	Estimator	Fully modified and dynamic least squares in place of ARDL	The elasticity should not depend on the estimator
R4	Income series	Real GDP rebuilt by chaining published growth rates from FY1972	Level-implied and published growth differ by more than one point in ten years
R5	Sample	Sample ended at FY2019	Excludes the pandemic and the crisis of FY2023

Note. The baseline is Specification A estimated by ARDL on national-accounts volumes for FY1973–FY2025, with lags chosen by the Akaike criterion up to three years and an unrestricted intercept.

3.9 | Software, Reproducibility and Limits of the Design

All models are estimated in EViews 14. The data file used is version 4 of the dataset, dated 11 November 2026. It is kept with a log of the source of every series, a log of every change made to the data and the checks reported in Table 5, and it is available from the author. The estimation file adds the step dummies for the break dates and their products with log income, built from the same data. Every statistic in Section 4 was read from the EViews output and reproduced independently from the same data with separately written code, and Appendix A maps each reported model to its specification. An exploratory pass on an earlier, unverified version of the data informed two choices made above, the median threshold and the allowance for breaks. No estimate from that pass is reported.

Five limits of the design should be kept in mind when the results are read. First, 53 annual observations is a small sample. The models are kept parsimonious and finite-sample critical values are used, but the power of the tests is limited, above all in the complexity models. Second, estimating on two measures of trade shows how much the anomalies in the official import volumes matter. It does not show which measure is right. Third, the real exchange rate is an approximation, the complexity index ends in 2017, and real GDP before FY2000 is the World Bank's extension of the official series, which is published on the 2015–16 base only from that year. Fourth, a demand function estimated from a single equation identifies a long-run association and not a cause. The possibility raised by Krugman (1989), that growth shapes the elasticities, is addressed only in part by the complexity variable. Fifth, the remittance-augmented ceiling treats remittances as the only source of external finance, so the role of borrowing is discussed in Section 5 but is not estimated.

4 | EMPIRICAL RESULTS

This section reports the estimates in the order of Table 6. Every model was estimated in EViews 14 on version 4 of the dataset, and every statistic in the tables except the Phillips–Perron *p*-values was also recomputed outside EViews from the same data as a check on transcription. Results are read against the rules

of Section 3.7, which were written before any model was estimated. Two abbreviations are used throughout: NA for the national-accounts volumes of trade and WP for trade values at constant world prices.

4.1 | Order of Integration

Table 9 summarises the unit-root tests. In levels, the augmented Dickey–Fuller and Phillips–Perron tests fail to reject a unit root for any of the seven series at the 10 percent level. The KPSS test, whose null hypothesis is stationarity around a trend, rejects for income, both export series and the real exchange rate, and does not reject for the two import series or world income. The two kinds of test therefore disagree for three series, and the test that allows for one break explains part of the disagreement. It rejects the unit root for imports at world prices, with a break in FY2004 at the start of the import boom of FY2004–FY2006, and the rejection holds whether one or two lags are used. It also rejects for imports in the national accounts, but there the break is placed in FY2021, four years from the end of the sample, and the rejection disappears when the lag length is shortened. World income is a borderline case ($p = 0.07$).

In first differences every series is stationary on the Dickey–Fuller and Phillips–Perron tests, with p-values of 0.02 or less. The KPSS statistic for the growth of income rejects with an intercept alone (0.561 against a critical value of 0.463) but not once a trend is allowed (0.052 against 0.146), which reflects the slowing of Pakistan's growth over five decades and not a second unit root. The series are thus a mixture of I(1) processes and processes that are stationary around a broken trend. None is I(2), so the gate set for this stage is passed and the bounds test can be applied.

Table 9

Unit-Root Tests, FY1973–FY2025

Series	ADF, level	PP, level	KPSS, level	Break test, level (date)	ADF, difference	KPSS, difference
ln Y	−0.84 (0.95)	0.94	0.223[a]	−3.24 (0.83), 1979	−5.42 (0.00)	0.561[a] / 0.052
ln M	−3.09 (0.12)	0.22	0.091	−5.41 (<0.01), 2021	−6.50 (0.00)	0.062
ln X	−1.48 (0.83)	0.77	0.197[a]	−3.18 (0.85), 2011	−7.42 (0.00)	0.140
ln Z	−3.03 (0.14)	0.28	0.111	−4.73 (0.07), 2019	−5.20 (0.00)	0.129
ln M^{w}	−2.98 (0.15)	0.11	0.100	−5.92 (<0.01), 2004	−6.71 (0.00)	0.158
ln X^{w}	−2.48 (0.33)	0.34	0.166[a]	−4.04 (0.34), 2015	−8.12 (0.00)	0.166
ln Q	−2.26 (0.45)	0.71	0.181[a]	−4.03 (0.36), 2010	−3.34 (0.02)	0.093

Note. ADF statistics with p-values in parentheses; PP columns give p-values only. Levels: intercept and trend, lag length by the Schwarz criterion. Differences: intercept. KPSS 5 percent critical values: 0.146 with trend, 0.463 without. [a] Stationarity rejected at 5 percent. For ln Y the difference column gives the statistic without and with a trend. The break test is the innovational-outlier test with a break in the intercept, trend included, date chosen to minimise the t statistic; 5 percent critical value −4.86.

4.2 | Long-Run Relations With Constant Parameters

Table 10 gives the bounds tests for the four demand equations when the elasticities are held constant over FY1973–FY2025. None of them finds a long-run relation. The F statistics range from 1.59 to 2.71 in three equations, below even the lower bound of 5.13 to 5.22 that applies at the 5 percent level. The fourth, exports at world prices, comes closest with 4.46, which lies between the bounds at 10 percent and below the lower bound at 5 percent. Under the rule of Section 3.7, no long-run relation is accepted in any equation. The speed

of adjustment is also implausibly slow: between 11 and 28 percent of a gap from the implied long-run path is closed in a year.

The diagnostic tests point to the reason. Serial correlation, conditional heteroskedasticity and non-normality are rejected in none of the four models, so the bounds tests themselves are valid. The RESET test, however, rejects the functional form in all four, at the 0.01 percent level for imports in the national accounts. The CUSUM line for imports at world prices crosses its 5 percent band in FY2011–FY2013 and again in FY2017–FY2018, and in the other equations the line stays inside the band but drifts in one direction for a decade or more, with turning points near FY1991 and FY2004. These are the marks of parameters that change over time. A test for a long-run relation loses power when such shifts are ignored (Gregory & Hansen, 1996), so the results of Table 10 do not show that the constraint is absent. They show that a single elasticity for five decades does not describe the data. The long-run coefficients in the table are reported for completeness and are not used further.

Table 10

ARDL Bounds Tests With Constant Parameters

	Imports, NA	Exports, NA	Imports, WP	Exports, WP
Model (observations)	ARDL(2,1) (52)	ARDL(1,0) (53)	ARDL(1,3) (51)	ARDL(1,0) (52)
Bounds *F*	2.71	1.59	1.77	4.46
Bounds *t*	−2.12	−1.60	−1.83	−2.86
Long-run elasticity (s.e.)	0.84 (0.12)	1.68 (0.30)	1.08 (0.22)	1.28 (0.09)
Adjustment coefficient	−0.198	−0.114	−0.128	−0.282
Breusch–Godfrey, *p*	0.629	0.989	0.895	0.841
ARCH, *p*	0.231	0.305	0.834	0.785
Jarque–Bera, *p*	0.514	0.373	0.064	0.804
RESET, *p*	0.0001	0.020	0.016	0.020
CUSUM / CUSUM of squares	Pass / pass	Pass / pass	Fail / pass	Pass / pass

Note. Unrestricted intercept (Case 3), lags chosen by the Akaike criterion with a maximum of three. Critical values for one regressor (Narayan, 2005): *F* at 5 percent 5.125–6.045 (55 observations) and 5.220–6.070 (50 observations); *t* at 5 percent −2.86 and −3.22. Breusch–Godfrey test with two lags, ARCH test with one, RESET with one fitted term. The long-run elasticities are not interpretable as cointegrating elasticities, because no long-run relation is found.

4.3 | Structural Breaks and Elasticities by Regime

Dating the Breaks

Table 11 reports the Bai–Perron sequential test applied to the static long-run form of each equation, with both the intercept and the elasticity allowed to change. The test finds three breaks in three of the equations and two in the fourth, and every accepted break is significant by a wide margin, with scaled *F* statistics between 15.9 and 69.4 against critical values of 11.5 to 14.0. As Section 3 explained, these statistics come from levels regressions with trending variables and strongly autocorrelated residuals (Durbin–Watson statistics between 0.28 and 0.54), so they are used to date the breaks and not as proof that the breaks matter (Kejriwal & Perron, 2010). That proof is sought inside the ARDL models below.

The dates fall into two clusters. Every equation has a break in FY1980 or FY1981, and every equation has one between FY2003 and FY2005. The first cluster coincides with the Extended Fund Facility of 1980

and the move from a dollar peg to a managed float in January 1982. The second coincides with the surge of inflows after 2001 and the import boom that began in FY2004. The remaining breaks are specific to one equation: FY1991 for exports in the national accounts, at the time of the trade and payments liberalisation of 1990–1991; FY1987 for imports at world prices; and FY2016 for imports in the national accounts. The later date for exports at world prices is not sharply identified. The sequential procedure first places it in FY2014, and it moves to FY2005 when both breaks are estimated together. The repartitioned dates are used throughout.

Table 11

Break Dates From the Bai–Perron Sequential Test

Equation	0 vs 1 break	1 vs 2 breaks	2 vs 3 breaks	Break dates (fiscal years)
Imports, NA	59.01[a]	26.93[a]	25.38[a]	1981, 2005, 2016
Exports, NA	69.41[a]	32.09[a]	15.87[a]	1980, 1991, 2003
Imports, WP	59.73[a]	40.69[a]	24.77[a]	1980, 1987, 2005
Exports, WP	45.33[a]	17.00[a]	13.11	1980, 2005
5 percent critical value	11.47	12.95	14.03	

Note. Scaled F statistics of the sequential $L + 1$ against L test (Bai & Perron, 1998, 2003) on the static regression of the log of trade on a constant and the log of income, both allowed to break; 15 percent trimming, at most three breaks, error distributions assumed equal across regimes. [a] Significant at 5 percent. Dates are from the repartition step, which re-estimates all break dates jointly.

Long-Run Relations With Breaks

Table 12 repeats the bounds test with the break terms of Equation 9 included: a step dummy for each break as a fixed regressor and the interaction of each dummy with income as a long-run regressor. The change from Table 10 is large. All four F statistics now exceed the 1 percent upper bound, which is the stricter test that Section 3.7 set for models with breaks. The t statistic on the adjustment coefficient is beyond its 1 percent bound in three equations and beyond the 5 percent bound in the fourth, imports at world prices. The adjustment coefficients rise to between −0.59 and −0.84, so that most of any gap from the long-run path is closed within a year, against at most 28 percent without breaks. The break terms are jointly significant in every equation, with p-values of 0.0007 or less, and are therefore kept.

The diagnostic record also improves. The RESET test, which rejected all four constant-parameter models, now passes in three; it still rejects for exports in the national accounts ($p = 0.026$), and that failure is carried forward to the robustness checks, where relative prices are added. No model shows serial correlation, so the bounds tests are valid. The ARCH test for imports in the national accounts is close to the 5 percent line ($p = 0.052$). The CUSUM test can only be computed for the years after the last break, because the coefficients of a break term are not identified before it; within that span the line stays inside its band in all four models. The CUSUM-of-squares test is not reported for these models, since after the last break it would rest on between 8 and 21 recursive residuals.

Table 12

ARDL Bounds Tests With Structural Breaks

	Imports, NA	Exports, NA	Imports, WP	Exports, WP
Breaks	1981, 2005, 2016	1980, 1991, 2003	1980, 1987, 2005	1980, 2005
Model (observations)	ARDL(2,0) (52)	ARDL(1,0) (53)	ARDL(3,2) (50)	ARDL(2,2) (51)
Bounds *F*	12.96	6.14	9.28	9.68
1 percent upper bound for *F*	5.87	5.87	5.87	6.36
Bounds *t*	−7.14	−5.25	−4.14	−5.90
1 percent upper bound for *t*	−4.60	−4.60	−4.60	−4.37
Adjustment coefficient (s.e.)	−0.749 (0.089)	−0.617 (0.107)	−0.587 (0.082)	−0.840 (0.130)
Break terms, joint *F* (*p*)	10.17 (0.000)	4.88 (0.001)	8.17 (0.000)	7.56 (0.000)
Breusch–Godfrey, *p*	0.480	0.858	0.135	0.852
ARCH, *p*	0.052	0.478	0.999	0.735
Jarque–Bera, *p*	0.586	0.240	0.384	0.572
RESET, *p*	0.865	0.026	0.644	0.545
CUSUM after last break	Pass	Pass	Pass	Pass

Note. Each model adds a step dummy for every break as a fixed regressor and the product of each dummy with log income as a long-run regressor entered at lag zero (Equation 9). Lag orders refer to the dependent variable and log income. The bounds test has four long-run regressors (three in the last column). Critical values for 50 observations (Narayan, 2005). The joint *F* tests all step dummies and interactions against zero.

Elasticities by Regime

The long-run income elasticity in each regime is the sum of the base elasticity and the shifts that have occurred up to that regime. Table 13 reports these sums with delta-method standard errors, and Figure 14 plots them. Two features stand out.

The first is the fall in the export elasticity. At world prices the elasticity of exports with respect to world income was 1.29 from FY1980 to FY2004 and 0.67 from FY2005 onward; both estimates are precise, with standard errors below 0.10, and the shift is significant at the 0.01 percent level. In the national accounts the elasticity has been 0.84 since FY2003, again precisely estimated. On both measures, therefore, Pakistan's exports have grown less than in proportion to world income for two decades, after a period in which they grew faster. This is the firmest result of the section, because it holds on both measures of trade.

The second is that the import elasticity cannot be pinned down as firmly for the recent period. On the national-accounts measure the long middle regime, FY1981–FY2004, gives a precise 0.58. After FY2005, however, the model separates two short regimes with elasticities of −0.60 and 2.20. A negative long-run income elasticity of imports has no sensible economic reading, and it rests on 11 observations in which the official volume of imports barely grew while income did. The world-price measure does not share it. It finds no break after FY2005 and gives an elasticity of 0.79 for FY2005–FY2025, with a standard error of 0.15. Under the rule that a result is firm only where both measures agree, the import elasticity after FY2005 is reported as a range and not as a single value. The early regimes, which contain between four and eleven observations, are imprecise in every equation and are not used for policy.

Table 13

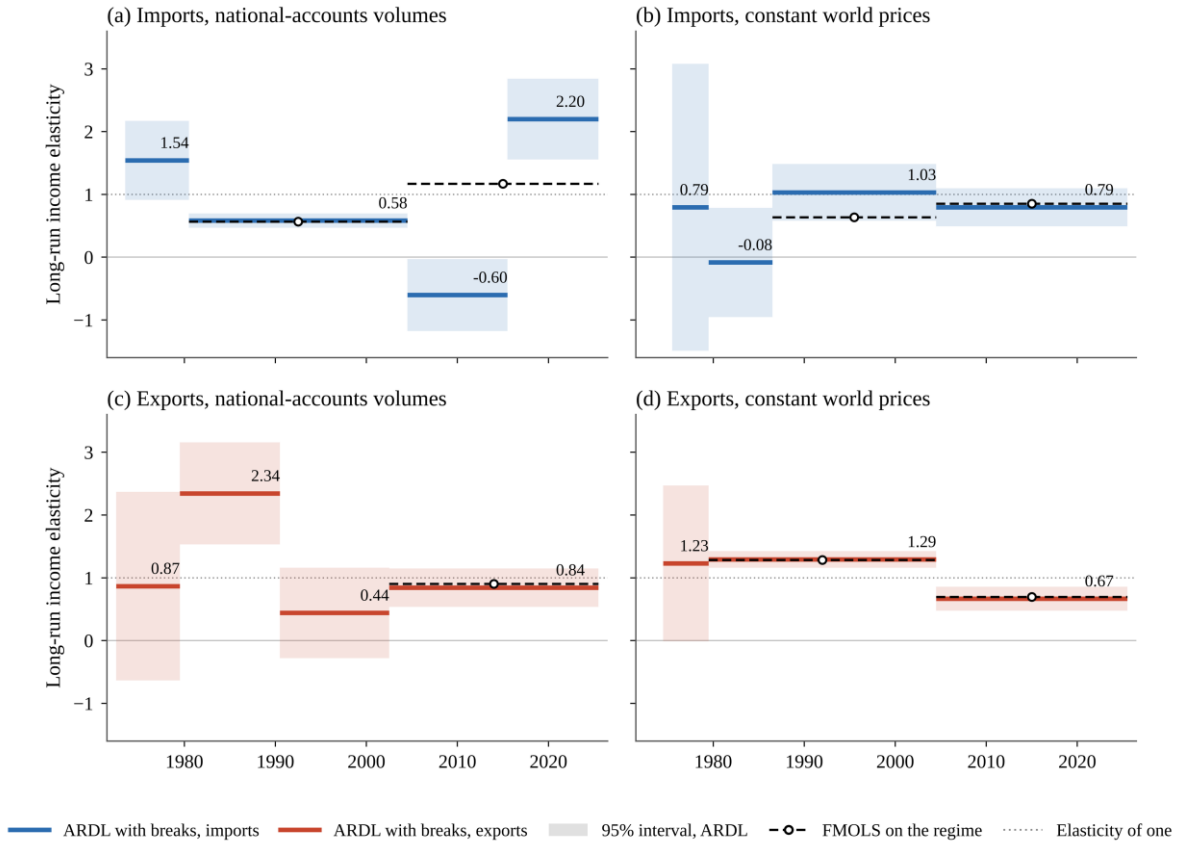
Long-Run Income Elasticities by Regime

Equation and regime	Years	ARDL with breaks	FMOLS	Reading
Imports, NA				
FY1974–FY1980	7	1.54 (0.32)	—	Too short to use
FY1981–FY2004	24	0.58 (0.06)	0.57 (0.07)	Estimators agree
FY2005–FY2015	11	−0.60 (0.29)	1.17 (0.26)[a]	Not confirmed by WP
FY2016–FY2025	10	2.20 (0.33)		Not confirmed by WP
Imports, WP				
FY1976–FY1979	4	0.79 (1.17)	—	Too short to use
FY1980–FY1986	7	−0.08 (0.44)	—	Too short to use
FY1987–FY2004	18	1.03 (0.23)	0.64 (0.08)	Estimators differ
FY2005–FY2025	21	0.79 (0.15)	0.85 (0.09)	Estimators agree
Exports, NA				
FY1973–FY1979	7	0.87 (0.77)	—	Too short to use
FY1980–FY1990	11	2.34 (0.41)	—	Short regime
FY1991–FY2002	12	0.44 (0.37)	—	Short regime
FY2003–FY2025	23	0.84 (0.16)	0.90 (0.15)	Estimators agree
Exports, WP				
FY1975–FY1979	5	1.23 (0.63)	—	Too short to use
FY1980–FY2004	25	1.29 (0.07)	1.29 (0.08)	Estimators agree
FY2005–FY2025	21	0.67 (0.10)	0.70 (0.09)	Estimators agree

Note. Long-run income elasticities with standard errors in parentheses. ARDL: sums of the base elasticity and the shift terms of the models in Table 12, standard errors by the delta method. FMOLS: fully modified least squares (Phillips & Hansen, 1990) estimated separately on each regime of at least 18 years, Bartlett kernel with Newey–West fixed bandwidth. [a] Estimated on FY2005–FY2025 as one regime. Years count the observations used in the ARDL model.

Figure 14

Long-Run Income Elasticities by Regime: ARDL With Breaks and FMOLS



Note. Solid lines: long-run elasticities from the ARDL models with breaks (Table 13), drawn over the years of each regime, with shaded 95 percent intervals. Dashed lines with circles: FMOLS estimated on the regime alone. The dotted line marks an elasticity of one. Panels (a) and (b) refer to import demand and income, (c) and (d) to export demand and world income.

4.4 | Stability Tests and a Second Estimator

Two further checks bear on the regime results. The first is the instability test of Hansen (1992), applied to the cointegrating regression with constant parameters estimated by fully modified least squares. Its null hypothesis is that the series are cointegrated with stable coefficients. Table 14 shows that the null is rejected for all four equations, at the 1 percent level for both export equations and at the 5 percent level for both import equations. This is evidence of instability from a test built differently from the Bai–Perron procedure and from the break terms in the ARDL models, and it points the same way. The full-sample FMOLS elasticities in the table are therefore averages over regimes, and like those in Table 10 they are not used further.

The second check is the estimator. The original plan was to re-estimate the break models themselves by FMOLS. That plan was dropped before any such model was run in EViews. FMOLS corrects for the correlation between the error and the innovations in the regressors, which it measures by the first differences of the regressors. The first difference of a break interaction jumps by the full level of income in the year of the break, and this single value dominates the long-run covariance on which the correction is based. Trial estimates made outside EViews gave elasticities of the wrong sign and, for one equation, an R^2 below zero. FMOLS was therefore estimated separately on every regime of at least 18 years, with no break terms (Appendix A, Table A2). The results are in Table 13 and Figure 14. In five of the seven regimes the two estimators differ by

less than one standard error. The two exceptions are those already flagged as weak: imports at world prices in FY1987–FY2004, where FMOLS gives 0.64 against 1.03 and is closer to the national-accounts value for the same years, and imports in the national accounts after FY2005, where FMOLS gives a single elasticity of 1.17 for a period the ARDL model splits in two.

Table 14

Hansen Instability Test and Full-Sample FMOLS

	Imports, NA	Exports, NA	Imports, WP	Exports, WP
Hansen L_c	0.664	0.915	0.533	0.713
p-value	0.012	<0.01	0.033	<0.01
FMOLS elasticity (s.e.)	0.77 (0.05)	1.86 (0.11)	0.94 (0.08)	1.33 (0.06)
Observations	53	52	53	52

Note. FMOLS with an intercept, Bartlett kernel and Newey–West fixed bandwidth of 4. The Hansen (1992) L_c test has the null hypothesis of cointegration with stable parameters; one stochastic trend, no trend in the cointegrating equation. The elasticities are averages over regimes once stability is rejected.

4.5 | Asymmetry Between Fast- and Slow-Growth Years

The threshold ARDL model splits the growth of income into its partial sums in years of fast growth and years of slow growth, with the median rate of 4.36 log points as the threshold (Equation 11). Table 15 reports it for both measures of imports. The two versions differ in quality. On the national-accounts measure the F statistic of 4.58 falls between the 5 percent bounds, the t statistic does not reach even the 10 percent bound, and the RESET and Jarque–Bera tests both reject. That model is weak and is reported only for comparison. On the world-price measure the model is sound: the F statistic of 7.08 exceeds the 5 percent upper bound, the t statistic is beyond its 1 percent bound, and none of the four diagnostic tests rejects.

Both versions point in the same direction, and the world-price version does so decisively. The long-run response of imports to income gained in slow-growth years is 2.33, against 0.36 for income gained in fast-growth years, and the Wald test rejects equality at the 0.01 percent level. The asymmetry predicted by the second hypothesis is therefore present, but in the long run it runs the other way from the one stated in Table 3, which expected imports to respond more strongly when growth is fast.

The annual data show what became of the expected pattern. Year by year, imports did grow faster on average in fast-growth years than in slow ones, by 8.6 against 3.7 percent a year at world prices and by 7.6 against 2.0 percent on volumes over FY1974–FY2025, although annual import growth is so volatile that neither difference is significant at 5 percent ($p = 0.21$ and 0.06). These surges do not last. In the long run the level of imports is tied far more closely to income gained in slow years. Remittances, which pay for a growing share of imports, also grew faster on average in slow years (13.3 against 7.4 percent), although that difference is not significant either ($p = 0.44$). One reading that fits these facts is that the import surges of booms are reversed by the stabilisations that end them, while the rise in imports that accompanies income regained in slower years, financed in part by remittances, persists. The data cannot establish this mechanism, and it is offered as an interpretation, not as a tested claim. The models in Table 15 do not include the break terms of Table 12, and whether the asymmetry survives once both are allowed for is a question the sample is too short to answer.

Table 15

Threshold ARDL Model of Import Demand

	Imports, NA	Imports, WP
Model (observations)	ARDL(2,2,0) (52)	ARDL(1,2,2) (52)
Bounds F (5 percent bounds 4.07–5.19)	4.58	7.08
Bounds t (5 percent bounds −2.86 to −3.53)	−3.20	−4.57
Long-run response, fast-growth years (s.e.)	0.45 (0.18)	0.36 (0.17)
Long-run response, slow-growth years (s.e.)	1.71 (0.40)	2.33 (0.33)
Wald test of equal responses, F (p)	5.03 (0.030)	17.33 (0.000)
Breusch–Godfrey, p	0.595	0.255
ARCH, p	0.656	0.759
Jarque–Bera, p	0.019	0.464
RESET, p	0.002	0.225

Note. Income growth is split at its median of 4.36 log points; the two partial sums enter as separate long-run regressors (Equation 11). Lag orders refer to imports and the two partial sums. Bounds for two long-run regressors and 50 observations (Narayan, 2005). The Wald test compares the two long-run responses, computed from the ARDL coefficients by the delta method.

4.6 | Export Complexity and the Elasticities

Table 16 reports Equations 12 and 13 for the four demand functions over FY1973–FY2017, the years covered by the legacy complexity series, with a maximum lag of two. Three of the four models find a long-run relation at the 5 percent level. For imports on the volume measure the F statistic of 5.56 exceeds the upper bound. For imports and exports at world prices the F statistics (4.67 and 4.68) fall between the bounds, and the rule of Table 6 refers the decision to the t statistic, which at −3.91 and −4.21 lies beyond the 5 percent upper bound of −3.78. The export model on the volume measure finds no relation: its F statistic of 2.84 is below even the 10 percent lower bound. All four models pass the serial-correlation, ARCH, normality and RESET tests at 5 percent, although serial correlation in the import model at world prices is close to the line ($p = 0.073$).

On the world-price measure both interactions have the signs that Equation 4 predicts, and both are significant. The import elasticity falls as complexity rises ($\pi_1 = -1.01$, s.e. 0.22, one-sided $p < 0.001$) and the export elasticity rises with it ($\varepsilon_1 = 0.61$, s.e. 0.22, one-sided $p = 0.004$). Pakistan's index fell from −0.24 in FY1973 to −0.93 in FY2017. Evaluated at those two values, the import elasticity rises from 1.06 to 1.76 and the export elasticity falls from 1.74 to 1.32, and in each case the change is several times its standard error (Table 16, lower panel). Figure 15 traces the two elasticities year by year. They cross in FY1996. Before then, world demand for Pakistan's exports responded more to world income than Pakistan's demand for imports did to its own income; since then the reverse has held.

On the volume measure the evidence is weaker. The import interaction has the predicted sign but is small and far from significant (−0.10, s.e. 0.20, one-sided $p = 0.31$), and the export equation, having no long-run relation, cannot be read at all. Under the rule that a result is firm only when both measures agree, the third hypothesis receives partial support. The world-price measure has a claim to more weight on this question,

since it records what exports earn in foreign exchange and the constraint bears on foreign exchange; but that is an argument about weight, not a reason to set the other measure aside.

Panel (c) of Figure 15 converts the elasticities into the export-demand ceiling $\varepsilon z/\pi$, with world growth held at its FY2005–FY2025 average of 2.95 percent. At the complexity of FY1973 the ceiling is 4.8 percent; at that of FY2017 it is 2.2 percent. Near the FY2017 value, each rise of 0.1 in the index raises the ceiling by about 0.23 percentage point. Three cautions apply. First, the complexity models carry no break terms, and their elasticity levels are higher than those of the break models in Table 13; it is the change across complexity levels that is informative, not the level. Second, complexity drifted down over the same decades in which the break models find the elasticities shifting, so the interaction may partly describe the same change as the breaks, and with 45 observations the two cannot be estimated together. Third, a single-equation association does not show that complexity caused the change. What it shows is that the decline in the complexity of Pakistan's exports and the deterioration of its income elasticities moved together, in the direction the structuralist argument predicts.

Table 16

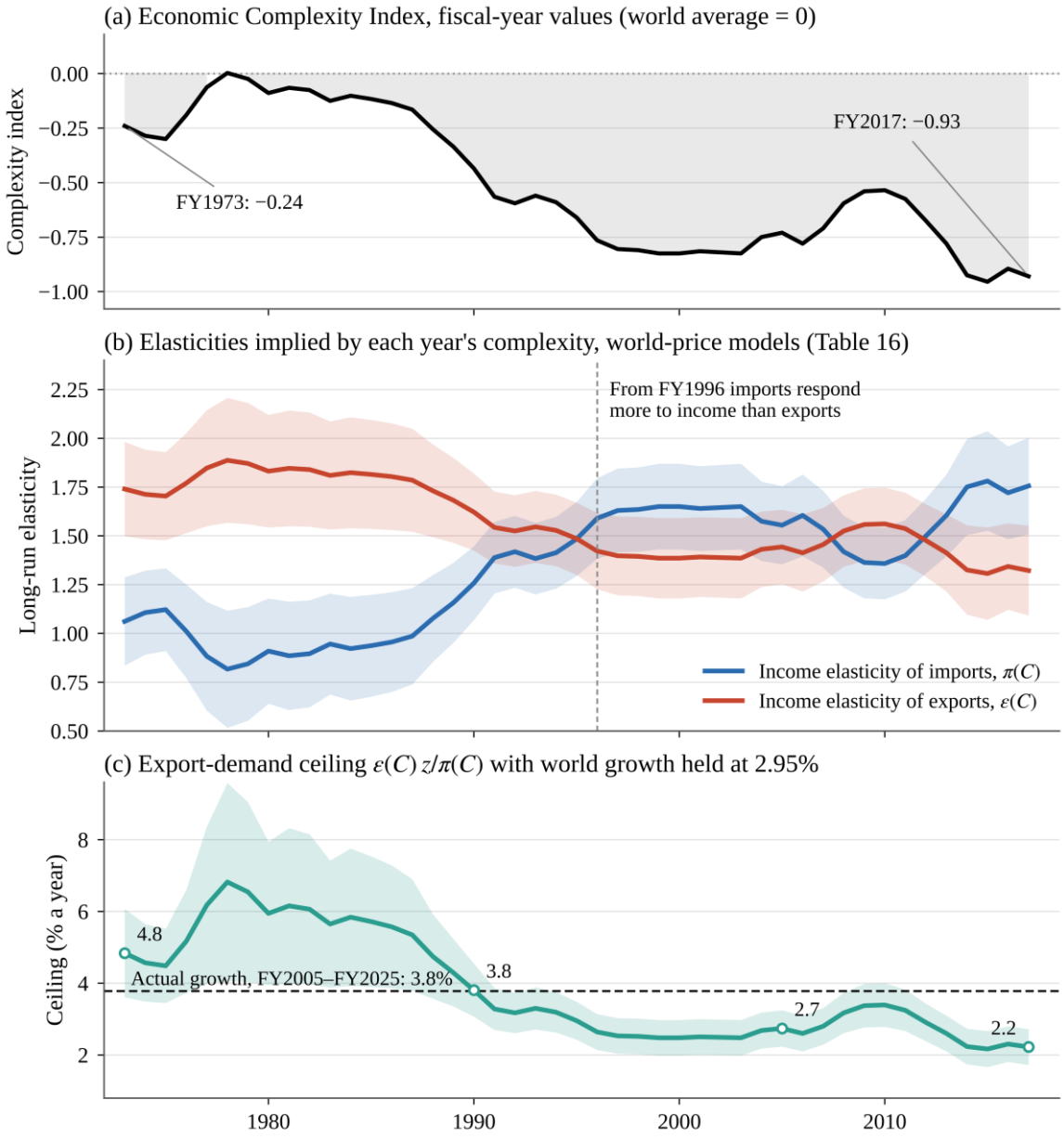
Export Complexity and the Income Elasticities, FY1973–FY2017

	Imports, NA	**Exports, NA**	**Imports, WP**	**Exports, WP**
Model (observations)	ARDL(2,2,2,0) (43)	ARDL(1,0,0,0) (45)	ARDL(2,0,0,0) (43)	ARDL(1,0,2,0) (43)
Bounds F	5.56	2.84	4.67	4.68
Bounds t	−3.73	−3.18	−3.91	−4.21
Long-run relation at 5 percent	Yes (F)	No	Yes (t)	Yes (t)
Income elasticity at $C = 0$	0.67 (0.14)	[3.01 (0.32)]	0.82 (0.15)	1.89 (0.16)
Complexity index, C	0.26 (0.53)	[−20.97 (4.85)]	3.45 (0.55)	−6.17 (2.29)
Interaction, $C \times$ log income	−0.10 (0.20)	[1.99 (0.46)]	−1.01 (0.22)	0.61 (0.22)
One-sided p, predicted sign	0.307	—	<0.001	0.004
Breusch–Godfrey, p	0.190	0.672	0.073	0.103
ARCH, p	0.740	0.324	0.481	0.499
Jarque–Bera, p	0.584	0.813	0.974	0.491
RESET, p	0.444	0.259	0.265	0.494
Implied income elasticity				
At FY1973 complexity ($C = -0.24$)	—	—	1.06 (0.12)	1.74 (0.12)
At FY2017 complexity ($C = -0.93$)	—	—	1.76 (0.13)	1.32 (0.12)

Note. Equations 12 and 13, FY1973–FY2017 (the years covered by the legacy complexity series), maximum lag of two, unrestricted intercept. Long-run coefficients with standard errors in parentheses. The interaction is π_1 in the import equations and ε_1 in the export equations; Equation 4 predicts $\pi_1 < 0$ and $\varepsilon_1 > 0$. Square brackets: no long-run relation, so the coefficients are not interpretable. Critical values for three long-run regressors and 45 observations (Narayan, 2005): F at 5 percent 3.535–4.733; t at 5 percent −2.86 and −3.78. Lower panel: Wald tests of $\pi_0 + \pi_1 C$ and $\varepsilon_0 + \varepsilon_1 C$ computed in EViews.

Figure 15

Export Complexity and the Income Elasticities, FY1973–FY2017



Note. Panel (a): legacy Economic Complexity Index (Observatory of Economic Complexity, 2026), aligned to fiscal years. Panel (b): $\pi(C) = 0.820 - 1.006C$ and $\varepsilon(C) = 1.886 + 0.606C$ from the world-price models of Table 16, with 95 percent intervals by the delta method; at $C = -0.24$ and -0.93 the standard errors equal those of the EViews Wald tests. Panel (c): $\varepsilon(C)z/\pi(C)$ with $z = 2.95$ percent; the band is an approximate 95 percent interval that treats the two estimated elasticities as independent.

4.7 | Robustness

Table 17 reports the checks listed in Table 8, applied to the constant-parameter models of Table 10, and Figure 16 sets the resulting elasticities beside the regime estimates of Table 13. Each check changes one element of the baseline and leaves the rest as it was.

Adding the real exchange rate (Specification B, check R2) changes the result in one equation. For imports at world prices the bounds test now finds a long-run relation at 5 percent, with an F statistic of 5.02 between the bounds and a t statistic of −3.69 beyond the 5 percent upper bound of −3.53. The real exchange rate enters with a long-run coefficient of −0.99 (s.e. 0.26): a real depreciation of 10 percent lowers the dollar value of

imports at constant world prices by about 10 percent. Under the rule of Section 3.4, Specification B is therefore the preferred constant-parameter model for this equation, and its income elasticity of 1.38 (s.e. 0.11) is the one used for the full-sample ceiling in Section 4.8. In the other three equations Specification B finds no long-run relation at 5 percent and Specification A is kept. For exports the price terms have the sign theory predicts, but the volume model has no long-run relation and in the world-price model the coefficient is significant only at 10 percent (0.31, $p = 0.098$). Relative prices thus matter for the foreign-exchange cost of imports and give little purchase on exports. The import result qualifies the conclusion of Felipe et al. (2010) that real depreciation does not improve Pakistan's current account: on the world-price measure it does reduce the import bill, even if the export response is weak.

The estimator makes little difference (R3). FMOLS and DOLS give full-sample elasticities within 0.05 of each other in every equation. These are averages over regimes, since the Hansen test rejects stability (Table 14), and they serve only to show that the estimator does not drive the results; the regime-level comparison of ARDL and FMOLS is in Table 13. Replacing real GDP by the series rebuilt from published growth rates (R4) moves the import elasticities by 0.03 to 0.04, well inside one standard error, and both bounds tests stay below the lower bound. The discrepancy between level-implied and published growth noted in Section 3.3 does not affect the conclusions.

Ending the sample at FY2019 (R5), before the pandemic and the crisis of FY2023, leaves three of the four conclusions unchanged. The exception is imports on the volume measure, where a long-run relation appears ($F = 7.19$ against a 5 percent upper bound of 6.14) with an elasticity of 0.73 (s.e. 0.06). This is consistent with the break evidence. The shortened sample keeps only four years of the FY2016 regime, in which this elasticity is highest, and the estimate of 0.73 lies between the FY1981–FY2004 value of 0.58 and the full-sample average of 0.84. The first estimate of the import equation at world prices on the shortened sample failed the serial-correlation test ($p = 0.034$). Following the rule of Section 3.5 it was re-estimated with a maximum lag of two, which selects ARDL(2,2) and passes the test ($p = 0.57$). The conclusion, no long-run relation, is the same in both versions, and only the re-specified model is reported. Taken together, the checks leave the conclusions of Sections 4.2 to 4.5 in place, with two qualifications: relative prices matter for imports measured in foreign exchange, and the import equation on the volume measure is sensitive to the last six years of data.

Table 17

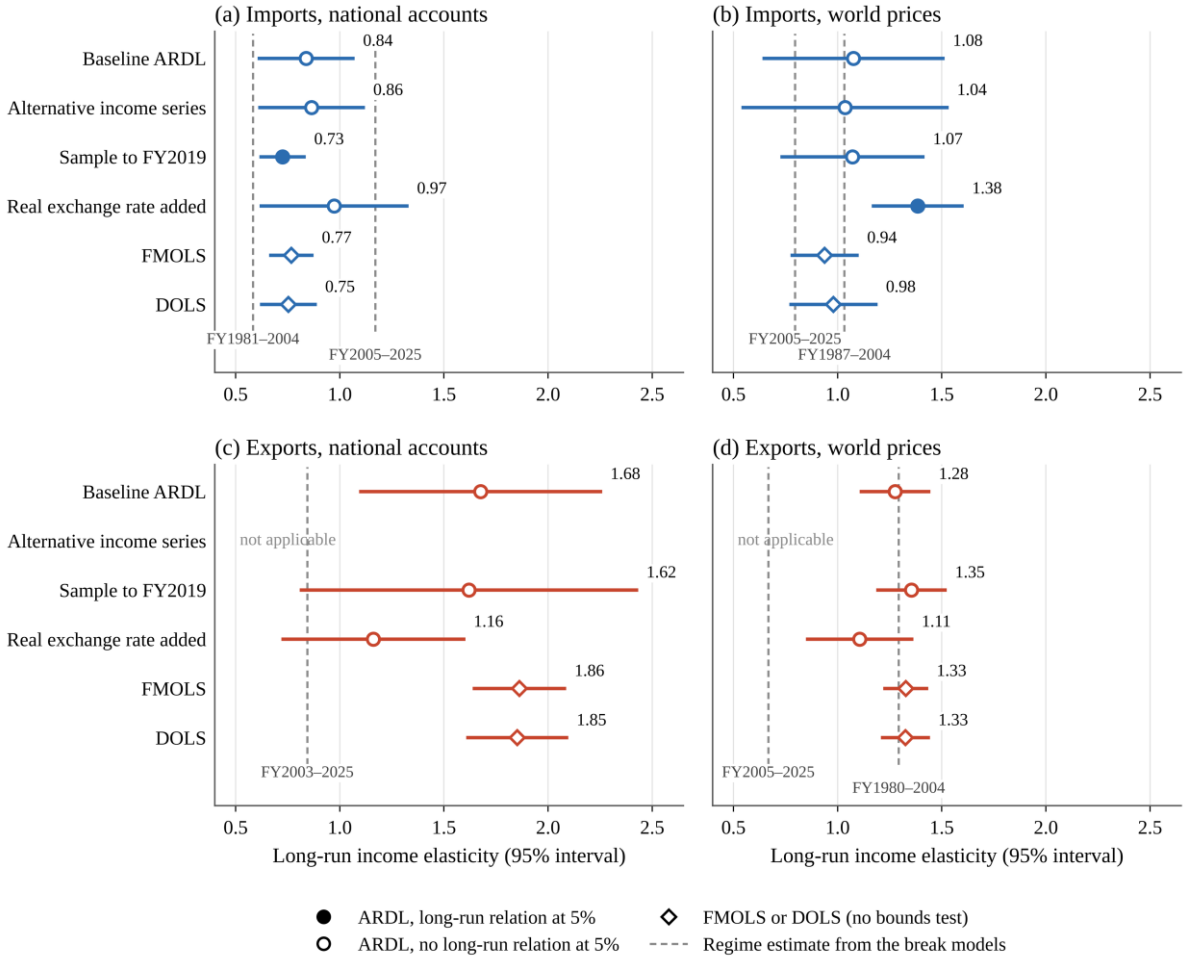
Robustness Checks: Bounds Tests and Long-Run Elasticities

	Imports, NA	Exports, NA	Imports, WP	Exports, WP
Bounds *F* statistic				
Baseline (Table 10)	2.71	1.59	1.77	4.46
R2: real exchange rate added	2.09	4.01	5.02[a]	4.40
R4: alternative income series	2.86	n.a.	1.43	n.a.
R5: sample ending FY2019	7.19[a]	1.59	3.39	4.36
Long-run income elasticity				
Baseline (Table 10)	0.84 (0.12)	1.68 (0.30)	1.08 (0.22)	1.28 (0.09)
R2: real exchange rate added	0.97 (0.18)	1.16 (0.23)	1.38 (0.11)[a]	1.11 (0.13)
R3: FMOLS	0.77 (0.05)	1.86 (0.11)	0.94 (0.08)	1.33 (0.06)
R3: DOLS	0.75 (0.07)	1.85 (0.13)	0.98 (0.11)	1.33 (0.06)
R4: alternative income series	0.86 (0.13)	n.a.	1.04 (0.25)	n.a.
R5: sample ending FY2019	0.73 (0.06)[a]	1.62 (0.41)	1.07 (0.18)	1.35 (0.09)
Long-run real exchange rate coefficient (R2)				
Real exchange rate, ln *Q*	−0.39 (0.39)	1.06 (0.31)	−0.99 (0.26)[a]	0.31 (0.19)
Breusch–Godfrey test, *p*				
R2: real exchange rate added	0.666	0.966	0.456	0.967
R4: alternative income series	0.615	n.a.	0.973	n.a.
R5: sample ending FY2019	0.933	0.782	0.572	0.905

Note. Standard errors in parentheses. [a] Long-run relation at 5 percent under the rule of Table 6: for R5 imports on volumes the *F* statistic exceeds the upper bound; for R2 imports at world prices it lies between the bounds and the *t* statistic exceeds the upper bound. Coefficients in the other ARDL models are reported but are not cointegrating elasticities. R4 changes the income series, so it applies only to the import equations (n.a.). FMOLS and DOLS (one lead and one lag) do not test for a long-run relation. The R5 import model at world prices is the re-specified ARDL(2,2); the first choice, ARDL(1,2), failed the serial-correlation test ($p = 0.034$) and is not reported. Model orders and samples for every entry are listed in Appendix A, Table A1.

Figure 16

Robustness of the Long-Run Income Elasticities



Note. Long-run income elasticities with 95 percent intervals from Table 17. Filled circles: ARDL models that find a long-run relation at 5 percent. Open circles: ARDL models that do not, whose coefficients are not cointegrating elasticities. Diamonds: FMOLS and DOLS. Dashed lines: regime elasticities from the break models (Table 13). The alternative income series applies only to the import equations.

4.8 | Growth Ceilings and the Four Hypotheses

The elasticities that pass the tests of Sections 4.2 to 4.7 are turned into growth ceilings with Equations 14 to 16, for the full sample and for the regimes of at least 18 years in which both an import elasticity and the matching export growth are available. Table 18 and Figure 17 report them. Growth rates are averages of annual percentage changes, as in Table 1. For the volume measure after FY2005 the import elasticity is the FMOLS estimate for the whole regime, since the ARDL break model splits that period into two short regimes whose elasticities have opposite signs (Table 13).

The Recent Regime

The years since FY2005 give the clearest answer. Real GDP grew by 3.8 percent a year. The weak-form ceiling, which divides actual export growth by the import elasticity, is 3.95 percent on the world-price measure and 2.95 percent on the volume measure, with standard errors of 0.77 and 0.66. The McCombie test does not reject equality between the estimated import elasticity and the one that would make the ceiling equal to actual growth on either measure ($t = -0.24$ and 0.99; $p = 0.81$ and 0.34), nor when FMOLS replaces ARDL on the

world-price measure ($t = 0.21$, $p = 0.84$). For two decades, then, Pakistan has grown at a rate that cannot be distinguished from its balance-of-payments-constrained rate. The strong-form ceiling, which replaces actual export growth by what world demand predicts, is lower still, at 2.5 and 2.1 percent. Exports grew faster than world income alone would explain (3.1 against 2.0 percent a year at world prices), but not fast enough to move the ceiling away from the growth the economy actually achieved.

The Earlier Regime and the Two Measures of Trade

The earlier regime shows why two measures of trade are needed. At world prices, FY1987–FY2004 tells the same story as the recent regime: growth of 4.6 percent against a weak-form ceiling of 4.8 percent and a strong-form ceiling of 3.9 percent, with the McCombie test far from rejection ($p = 0.87$). On the volume measure the weak-form ceiling for FY1981–FY2004 is 13.7 percent, almost three times actual growth, and equality is rejected decisively. The gap comes from the export side. Export volumes grew by 8.0 percent a year in these years, but the value of exports at constant world prices grew by only 4.5 percent, because the price of Pakistan's exports fell by about half relative to the world GDP deflator between FY1980 and FY2004. Volume growth sold at falling relative prices earns little foreign exchange, and foreign exchange is what the constraint rations. The volume-based ceiling for this period therefore overstates the room for growth, and the episode is a measured case of the terms-of-trade mechanism that Prebisch (1950) and Singer (1950) described. One caution applies to the world-price result. With the FMOLS elasticity (0.64) in place of the ARDL one (1.03), the weak-form ceiling for FY1987–FY2004 rises to 7.7 percent and equality is rejected. The ARDL estimate is retained because it comes from the model that passes the bounds test, but the result for this regime is less secure than that for FY2005–FY2025.

The Full Sample and the Role of Remittances

Over the full sample only one model, the import equation at world prices with the real exchange rate, supplies a valid long-run elasticity, 1.38. With it the trade-only ceiling is 3.1 percent against actual growth of 4.6 percent, and equality is rejected ($t = 4.00$, $p < 0.001$): over five decades Pakistan grew faster than its exports alone could finance. Remittances account for most of the difference. Workers' remittances grew by 10.5 percent a year at constant world prices and supplied on average 29 percent of the foreign exchange earned from exports and remittances together, and with them the ceiling of Equation 16 is 4.4 percent (s.e. 0.36), within one standard error of actual growth. Real depreciation, which this model finds significant, offers a second explanation: on its own, the average real depreciation of the rupee, 1.5 percent a year, raises the trade-only ceiling to 4.2 percent. Remittances and depreciation are alternative accounts of the same gap, and these data cannot apportion it between them.

Within the regimes, the effect of remittances depends on how fast they grew, as the fourth hypothesis expects. In FY1987–FY2004 remittances at constant world prices grew more slowly than exports (3.8 against 4.9 percent a year), and including them lowers the ceiling slightly, from 4.8 to 4.6 percent. In FY2005–FY2025 they grew by 9.8 percent a year and raise the ceiling from 4.0 to 6.9 percent. Actual growth did not follow: it stayed at 3.8 percent, close to the trade-only ceiling. The foreign exchange that remittances added was absorbed by imports, which grew by 5.9 percent a year at world prices against 5.2 percent for the combined

earnings from exports and remittances, while the long-run import elasticity attributes only 3.0 points of that import growth to income growth. In 15 of the 21 years of this regime income grew at or below the median rate, the kind of growth that the threshold model of Section 4.5 ties most closely to the import level in the long run. Remittances relaxed the external constraint on paper, but the room they created was taken up by imports beyond those that income growth explains.

Table 18

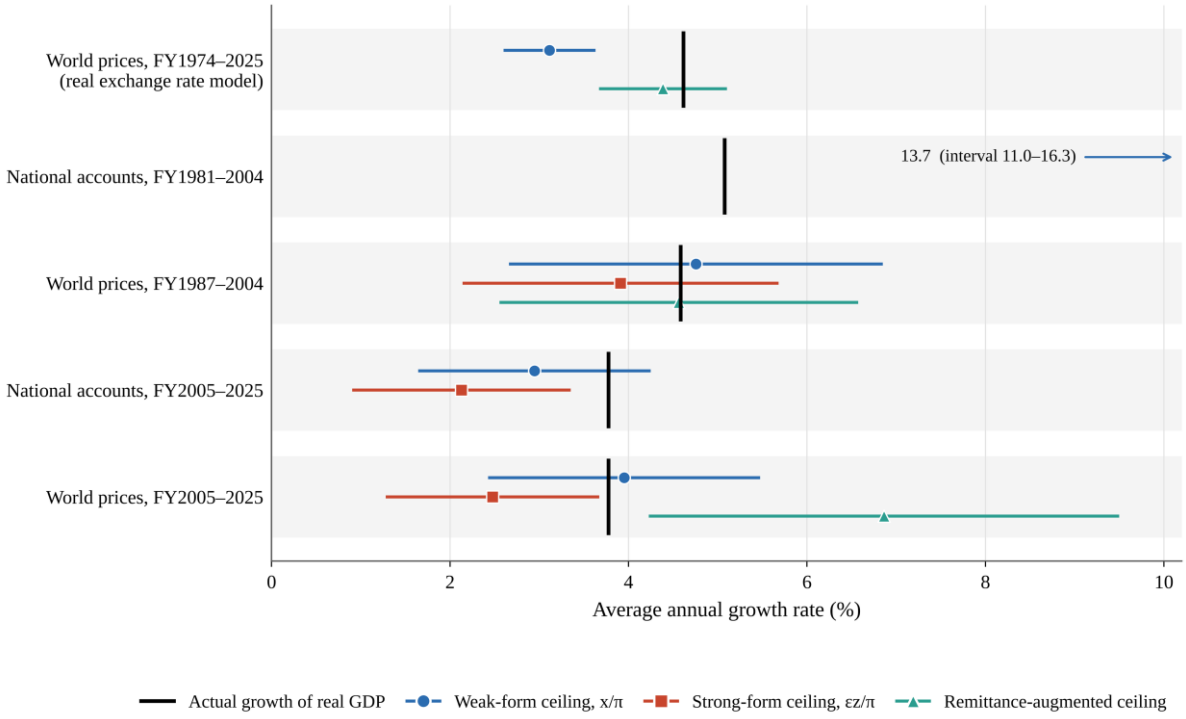
Balance-of-Payments-Constrained Growth Rates and the McCombie Test

Measure and period	g	x	π	x/π	$\varepsilon z/\pi$	g_R	$\pi*$	t (p)
WP, FY1974–FY2025[a]	4.62	4.31	1.38 (0.11)	3.11 (0.25)	—	4.39 (0.36)	0.93	4.00 (<0.001)
NA, FY1981–FY2004	5.08	7.96	0.58 (0.06)	13.67 (1.36)	—	—	1.57	−17.07 (<0.001)
WP, FY1987–FY2004	4.59	4.91	1.03 (0.23)	4.76 (1.06)	3.91 (0.90)	4.56 (1.02)	1.07	−0.17 (0.868)
with FMOLS π			0.64 (0.08)	7.71 (0.98)	6.34 (0.87)	7.40 (0.94)		−5.34 (<0.001)
NA, FY2005–FY2025[b]	3.78	3.45	1.17 (0.26)	2.95 (0.66)	2.13 (0.62)	—	0.91	0.99 (0.336)
WP, FY2005–FY2025	3.78	3.14	0.79 (0.15)	3.95 (0.77)	2.48 (0.60)	6.86 (1.34)	0.83	−0.24 (0.814)
with FMOLS π			0.85 (0.09)	3.69 (0.41)	2.31 (0.42)	6.41 (0.70)		0.21 (0.835)

Note. g: actual growth of real GDP; x: growth of real exports on the stated measure; both are averages of annual percentage changes (percent a year). π: long-run income elasticity of imports from the ARDL break models (Table 13) unless stated. Ceilings in percent a year with delta-method standard errors that treat the growth rates as known: weak form x/π (Equation 14); strong form $\varepsilon z/\pi$ (Equation 15), with ε from the export regime that covers the period (1.29 for FY1980–FY2004, 0.84 for FY2003–FY2025, 0.67 for FY2005–FY2025) and z the average growth of world income (3.12 and 2.95 percent); remittance-augmented g_R (Equation 16), with $\theta = 0.71$, 0.82 and 0.65 and real remittance growth $r = 10.5$, 3.8 and 9.8 percent for the three world-price periods. $\pi* = x/g$ (Equation 17); $t = (\pi - \pi*)/\mathrm{se}(\pi)$, with p-values from the t distribution on the residual degrees of freedom of the model that supplies π. On volumes with the FMOLS elasticity, the FY1981–FY2004 weak-form ceiling is 14.04 ($t = -14.41$). Standard errors and p-values in parentheses below each estimate. [a] Specification B, with the real exchange rate (Table 17), the only full-sample model with a valid long-run import elasticity. [b] FMOLS for the whole regime.

Figure 17

Balance-of-Payments-Constrained Growth Rates Against Actual Growth



Note. Points are the ceilings of Table 18 and lines their 95 percent intervals; the vertical bar in each row is actual growth of real GDP over the same years. The volume-based weak-form ceiling for FY1981–FY2004 lies off the scale, as marked. Strong-form and remittance-augmented ceilings are shown where the inputs exist.

Verdicts on the Hypotheses

Table 19 sets the results against the rules of Table 7. The first hypothesis is supported: once breaks are allowed for, import demand has a long-run relation on both measures with a significant adjustment coefficient, and in the recent regime actual growth cannot be distinguished from the constrained rate on either measure or with either estimator. Where equality is rejected, the direction of the departure is reported and explained: growth below a volume-based ceiling inflated by falling export prices in FY1981–FY2004, and growth above the trade-only ceiling over the full sample, financed by remittances. The second hypothesis is supported, with the long-run asymmetry running against the expected direction. The third receives partial support, on the world-price measure only. The fourth is supported over the full sample and in the conditional form in which it was stated, since remittances lifted the ceiling only in the regime in which they outgrew exports; but in that regime the higher ceiling was not converted into growth, so the second part of the rule, that the remittance-augmented ceiling should lie closer to actual growth, is not met.

Table 19

Verdicts on the Four Hypotheses

	Rule (Table 7)	Evidence	Verdict
H1	Long-run import relation at 5 percent; negative and significant adjustment; $\pi = \pi*$ not rejected	Long-run relations on both measures with breaks (Table 12), adjustment −0.59 and −0.75. $\pi = \pi*$ not rejected for FY2005–FY2025 on both measures and both estimators, or for FY1987–FY2004 at world prices with ARDL. Rejected for FY1981–FY2004 on volumes (export prices fell by half) and for the full sample (growth above the trade-only ceiling)	Supported
H2	A break with jointly significant terms, or symmetry rejected	Break terms jointly significant in all four equations ($p \leq 0.001$); stability rejected by the Hansen test in all four; symmetry rejected at world prices ($p < 0.001$). The long-run response is larger for income gained in slow-growth years	Supported; asymmetry in the opposite direction to that expected
H3	$\pi_1 < 0$ and $\varepsilon_1 > 0$, each significant at 5 percent (one-sided); partial if only one holds	World prices: $\pi_1 = -1.01$ ($p < 0.001$), $\varepsilon_1 = 0.61$ ($p = 0.004$). Volumes: $\pi_1 = -0.10$ ($p = 0.31$); export equation without a long-run relation	Partially supported (world prices only)
H4	g_R above x/π and closer to actual growth	Full sample: 4.4 against 3.1, actual 4.6 (met). FY1987–FY2004: remittances grew more slowly than exports and lower the ceiling. FY2005–FY2025: 6.9 against 4.0, actual 3.8 (not met)	Partially supported

Note. Rules as stated in Table 7 before estimation. Evidence from Tables 12 to 18.

5 | POLICY SIMULATIONS AND DECISION RULES

This section turns the estimates into statements a policy maker can use. It asks what growth the external accounts can carry, what a higher target would require, why stabilisation has not loosened the constraint, and which rules would keep growth plans inside it. Nothing is re-estimated here. Every number comes from Section 4 or from simple arithmetic on it, and the table it comes from is named.

5.1 | The External Speed Limit and the 6 Percent Target

For the elasticities that have held since FY2005, the weak-form ceiling is 2.9 to 4.0 percent a year and the strong-form ceiling 2.1 to 2.5 percent (Table 18). The government's Uraan Pakistan plan, launched on 31 December 2024, aims at sustainable growth of 6 percent by 2028 and exports of US$60 billion by FY2028 ("Govt Unveils 'Uraan Pakistan'," 2024). Rearranging Equation 14 gives the export growth that a growth target $g*$ requires, and Equation 15 the income elasticity of export demand that world demand would have to supply:

$$x* = \pi\, g* \tag{19}$$

$$\varepsilon* = \pi\, g* / z \tag{20}$$

Table 20 evaluates both for targets of 4, 5 and 6 percent, with world income growing at its FY2005–FY2025 average of 2.95 percent. Growth of 6 percent requires real exports to grow by 4.8 percent a year on the world-price measure and by 7.0 percent on the volume measure, against the 3.1 and 3.4 percent achieved since FY2005: between one and a half and two times the recent pace, sustained for a decade or more. Expressed as an elasticity, 6 percent growth needs world demand for Pakistan's exports to respond to world income with

an elasticity of 1.62 at world prices. That is higher than the 1.29 of FY1980–FY2004 and more than twice today's 0.67. On the volume measure the required elasticity is 2.38, almost three times the present 0.84. Figure 18 draws the same arithmetic as contours in the space of the two elasticities. Today's position lies between the 2 and 3 percent contours, and none of the regime estimates since FY1991, on either measure, comes close to the 6 percent contour.

Remittances change the arithmetic but, on the evidence of Section 4.8, not the outcome. With the share of exports in foreign-exchange earnings at its FY2025 value of 0.52 and export growth at its recent rate, Equation 16 can be solved for the growth of remittances that would finance a target:

$$r* = (\pi\, g* - \theta x) / (1 - \theta) \tag{21}$$

On this arithmetic, 6 percent growth would be financed if remittances at constant world prices grew by 6.5 percent a year. They grew by 9.8 percent a year over FY2005–FY2025, so on paper the target was already within reach. In practice growth stayed at 3.8 percent, because the foreign exchange that remittances supplied was spent on imports beyond those that income growth explains (Section 4.8). A plan that counts remittance growth as capacity for faster growth repeats an assumption that the last two decades contradict.

Table 20

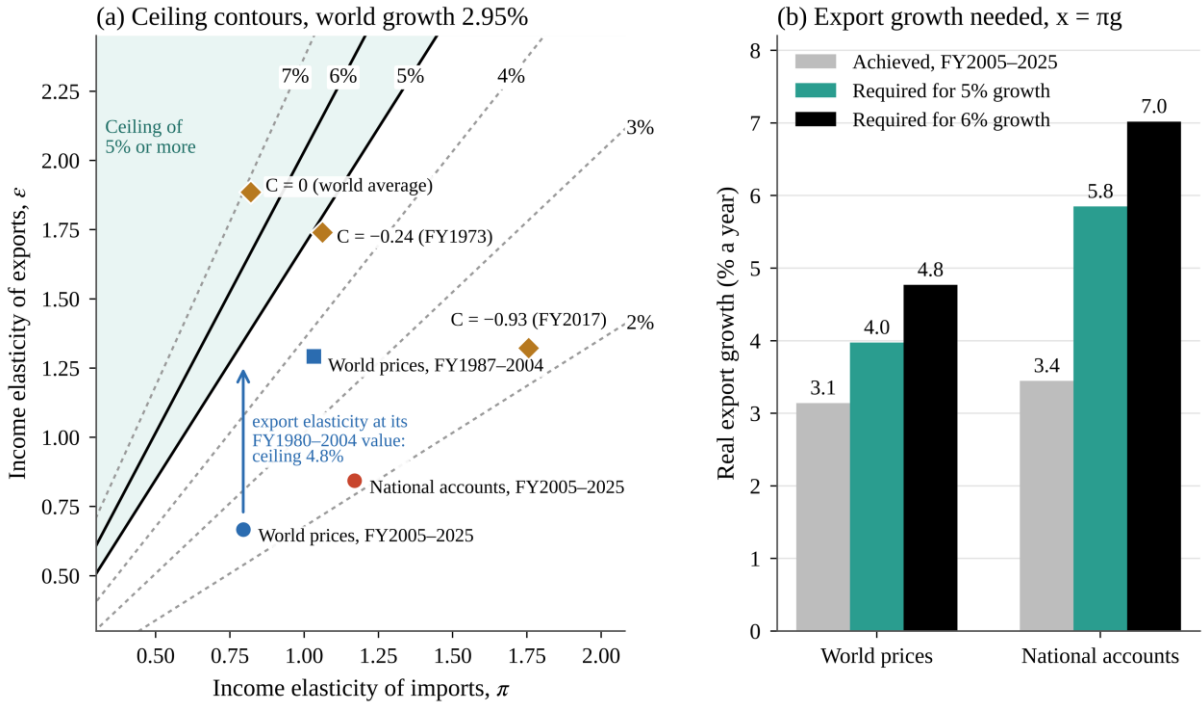
What a Higher Growth Target Requires

Growth target (percent)	Export growth, WP	Export growth, NA	Export elasticity, WP	Export elasticity, NA	Remittance growth, WP
4	3.2	4.7	1.08	1.59	3.2
5	4.0	5.8	1.35	1.98	4.9
6	4.8	7.0	1.62	2.38	6.5
Achieved, FY2005–FY2025	**3.1**	**3.4**	**0.67**	**0.84**	**9.8**

Note. Export growth from Equation 19 and export elasticity from Equation 20, with π = 0.79 (WP) and 1.17 (NA) as in Table 18 and world income growth z = 2.95 percent, its FY2005–FY2025 average. Remittance growth from Equation 21 with θ = 0.52 (FY2025) and export growth x = 3.14 percent (WP, FY2005–FY2025). Growth rates in percent a year; elasticities are long-run income elasticities. The last row gives the values achieved or estimated for FY2005–FY2025.

Figure 18

Elasticities Needed for Higher Growth and the Export Growth They Imply



Note. Panel (a): each line joins the pairs of export and import elasticities that give the growth ceiling shown, $\varepsilon z/\pi$, with world growth $z = 2.95$ percent (the FY2005–FY2025 average); the shaded area gives a ceiling of 5 percent or more. Circles and square: regime estimates (Table 13; the volume-based import elasticity is the FMOLS estimate). Diamonds: elasticities implied by the complexity models at the stated value of the index (Table 16). The arrow shows the effect of restoring the export elasticity of FY1980–FY2004 at today's import elasticity. Panel (b): real export growth achieved in FY2005–FY2025 and the growth required by Equation 19.

5.2 | Raising the Ceiling: Export Structure Rather Than Export Prices

The ceiling moves only if the elasticities move, and the evidence of Section 4 points to the export elasticity and to the composition of exports behind it. Three results support that emphasis. First, the elasticity that has fallen most clearly is the export elasticity, from 1.29 to 0.67 at world prices (Table 13). Restoring it to its FY1980–FY2004 value, with the import elasticity unchanged, would raise the strong-form ceiling from 2.5 to 4.8 percent (Figure 18). Second, on the world-price measure the export elasticity rises and the import elasticity falls as complexity rises (Table 16), so that upgrading pays on both sides of Equation 4. Near the FY2017 level of the index each rise of 0.1 adds about 0.23 percentage point to the export-demand ceiling, and a return to the complexity of FY1990 would add about 1.6 points (Figure 15). Third, relative prices give little purchase on exports. The real exchange rate has no long-run effect on exports that can be read at 5 percent: the volume equation finds no long-run relation, and in the world-price equation the coefficient is significant only at 10 percent (Table 17). A weaker rupee can lower the foreign-exchange cost of imports, since imports at world prices respond to the real exchange rate with an elasticity of about −1, but it does not raise the ceiling in the way a higher export elasticity does.

The policy implication is a change of target. Export policy in Pakistan has usually been judged by the value of exports in a given year. The constraint is governed by how exports respond to world income over decades, and that depends on what is exported. The literature on upgrading describes the direction of travel:

towards goods that resemble those of richer countries, a more diversified basket and products that fewer countries can make (Hausmann et al., 2007; Hidalgo & Hausmann, 2009). The estimates here do not say which products or policies would get there, and the World Bank (2025) and the Pakistan Institute of Development Economics (2025) discuss the barriers in detail. What they add is a measure of the stakes: on the world-price estimates, the fall in complexity between FY1973 and FY2017 is associated with a fall of more than half in the export-demand ceiling.

5.3 | Why Stabilisation Has Not Loosened the Constraint

Pakistan's stabilisations have repeatedly restored external balance by compressing demand. The threshold estimates of Section 4.5 suggest why this has not lifted the ceiling. Year by year, imports grew faster on average in fast-growth years than in slow ones, and the booms ended in import compression. Yet in the long run the level of imports follows income gained in slow-growth years far more closely, with an elasticity of 2.33, than income gained in fast-growth years, with an elasticity of 0.36. The surges of the booms are reversed; the rise in imports that comes with income regained in slower years is not. A cycle can therefore end with imports higher relative to income than it began, a ratchet that demand compression does not undo.

The recent regime fits this description. In 15 of the 21 years from FY2005 to FY2025 growth was at or below the median rate, imports at world prices grew by 5.9 percent a year against income growth of 3.8 percent, and remittances, which on average grew fastest in slow years, financed the difference. Stabilisation on this pattern buys time but leaves the elasticities, and with them the ceiling, where they were. External borrowing, which the ceilings of Section 4.8 leave out (Section 3.9), plays the same part in this account as remittances: it widens the room for imports while it lasts, and its servicing narrows that room afterwards.

5.4 | Five Decision Rules

Table 21 condenses the results into five rules. Each names an indicator that can be computed from published data, a threshold taken from the estimates and the current reading. The rules are meant to discipline the targets that governments and lenders agree on, not to replace judgement, and their parameters should be re-estimated as new data arrive.

Rule 1: cap the growth target at the external speed limit. The medium-term growth target should not exceed the weak-form ceiling computed from the last ten years of export growth, taking the lower of the two measures, since the two bracket the foreign-exchange position from different sides (Table 18). For FY2016–FY2025 the cap is 2.9 percent on the world-price measure and 3.7 percent on the volume measure. A target of 6 percent is about twice the binding cap.

Rule 2: state export ambitions as an elasticity. Equation 20 gives the export elasticity that a growth target requires: for 6 percent, 1.62 at world prices against 0.67 today. The elasticity should be re-estimated every five years with the methods of Section 3, so that export performance is judged by the response of exports to world income and not by their value in a good year.

Rule 3: make export complexity a monitored target. Near its current level, each rise of 0.1 in the complexity index is worth about 0.23 percentage point on the export-demand ceiling (Table 16). Because the

legacy and newer complexity series cannot be joined (Section 3.2), the target should be set on the newer series and the conversion re-estimated once that series is long enough.

Rule 4: keep remittances out of the growth target. When remittances grow faster than exports, the extra foreign exchange should be treated as a buffer, for reserves and for the servicing of external debt, rather than as room for faster growth. Since FY2005 the remittance-augmented ceiling has been 6.9 percent while growth has been 3.8 percent (Table 18): the room was not converted into growth.

Rule 5: watch the gap between imports and the foreign exchange that pays for them. Let m be the growth of imports and f the growth of earnings from exports and remittances, both at constant world prices, and define the three-year average gap

$$G_t = (1/3)\,\Sigma_{j=0}^{2}\,(m_{t-j} - f_{t-j}) \tag{22}$$

A positive value of G for two successive years means that imports have outgrown the foreign exchange that pays for them for long enough to drain reserves. In the sample this happened in six spells: FY1976–FY1977, FY1989–FY1990, FY1993–FY1994, FY2005–FY2008, FY2017–FY2019 and FY2022–FY2023. Each was accompanied, or followed within a year, by a Fund arrangement, while the arrangements that came into force in FY1981 and FY2014 were not preceded by such a spell. This is a descriptive check within the sample, not an out-of-sample test of an early-warning model. For exit from Fund support the rule implies a simple condition: the growth path agreed for the years after a programme should keep G below zero with growth at the cap of Rule 1. The reading for FY2025 is −8.6 percentage points, a margin created mainly by the compression of imports in FY2023.

Table 21

Five Decision Rules for External Policy

Rule	Indicator and threshold	Reading for FY2025	Evidence
1. Growth target cap	Medium-term target ≤ the lower of x/π on the two measures; x = ten-year average real export growth; π = 0.79 (WP), 1.17 (NA)	2.9 percent (WP) and 3.7 percent (NA), FY2016–FY2025	Tables 13 and 18; Equation 14
2. Export elasticity target	Required elasticity $\pi g*/z$ (Equation 20); re-estimated every five years	1.62 required for 6 percent growth (WP); 0.67 at present	Tables 13 and 20
3. Complexity as a policy target	Complexity index monitored; +0.1 near the FY2017 level ≈ +0.23 point on the export-demand ceiling	−0.93 in FY2017 (legacy series); the FY1990 level, −0.44, is worth about 1.6 points	Table 16; Figure 15
4. Remittances as a buffer	Growth target not raised when remittances outgrow exports; the excess counted towards reserves and debt service	Remittance-augmented ceiling 6.9 percent against growth of 3.8 percent, FY2005–FY2025	Table 18; Section 4.8
5. Import–earnings gap	G (Equation 22) above zero for two successive years signals a coming stop; exit plans keep G below zero at the Rule 1 cap	G = −8.6 points (FY2023–FY2025)	Tables 15 and 18; Equation 22

Note. WP: world-price measure; NA: national-accounts (volume) measure. Readings use the dataset described in Section 3 and the estimates of Section 4; they should be updated each year as new data are published.

5.5 | Limits of the Policy Reading

Four limits apply to this reading. The elasticities are long-run averages over regimes of two decades, so they bound what growth can be sustained and do not forecast any single year. They come from single-equation models, which identify associations and not causes. The complexity effects rest on a series that ends in FY2017 and on models without break terms, so they indicate the direction and the rough size of the stakes rather than a precise return to any policy. And external borrowing, which has financed part of Pakistan's imports in most of the years studied, is not part of the ceilings, so the rules say nothing about how much borrowing is prudent. They say only that borrowing, like remittances, does not raise the growth rate that exports can sustain.

6 | CONCLUSION

6.1 | Summary of Findings

This paper set out to test whether Pakistan's stop-go growth reflects a balance-of-payments constraint, and whether the composition of its exports has tightened that constraint. The answer to the first question is yes, with qualifications that matter. Elasticities held constant for five decades produce no long-run relation, but once breaks near FY1980 and FY2003–FY2005 are allowed for, import and export demand settle into stable relations on both measures of trade. Since FY2005 the income elasticity of export demand has been 0.67 to 0.84, against 1.29 before, and growth of 3.8 percent a year has been indistinguishable from the balance-of-payments-constrained rate of 2.9 to 4.0 percent. Over the full sample growth ran above the trade-only ceiling, by an amount that remittances, or alternatively real depreciation, can account for.

The answer to the second question is a qualified yes. On the world-price measure, the decline in export complexity between FY1973 and FY2017 is associated with a higher import elasticity and a lower export elasticity, a combination that cuts the export-demand ceiling by more than half. On the volume measure the evidence is weak or absent, so the support is partial. Two further findings bear on the stop-go pattern itself. In the long run imports respond much more to income regained in slow-growth years than to income gained in booms, so stabilisation restores balance without lowering import dependence. And the foreign exchange that remittances supplied after FY2005 was absorbed by imports rather than converted into faster growth.

6.2 | Contribution

The paper adds to the literature on balance-of-payments-constrained growth in four ways. It shows, for a long single-country sample, that structural breaks can hide a constraint that constant-parameter tests miss, and that the break dates line up with policy regimes. It shows that the choice between volume and foreign-exchange measures of trade is not a technicality: in FY1981–FY2004 a volume-based ceiling overstates the room for growth almost threefold, because export prices fell by half relative to world prices, which gives a measured form to the terms-of-trade argument of Prebisch (1950) and Singer (1950). It brings economic complexity inside the import and export demand functions, rather than beside them, and finds the signs that the multi-sector version of the law predicts (Araujo & Lima, 2007; Romero & McCombie, 2018). And it fixes its decision rules before estimation and reports every departure from them, in line with the transparency standards that Christensen and Miguel (2018) propose for economics.

6.3 | Limitations and Further Research

The limits of the design have been stated where they bite: a sample of 53 annual observations, single-equation models, a complexity series that stops in FY2017, remittances as the only financing flow, and break and asymmetry models estimated separately. Each points to further work. The complexity models should be re-estimated on the newer product classification once it covers enough years. A multi-sector decomposition with product-level data would show which export lines carry the elasticity and which drag it down. Quarterly data would allow breaks and asymmetry to be modelled together. And adding the servicing of external debt to Equation 16 would turn the remittance-augmented ceiling into a full financing constraint.

The policy message is simple to state and hard to act on. Pakistan's growth has been held to the rate that the foreign exchange earned by its exports can sustain, and that rate has fallen as its exports have become simpler. Raising the growth target without changing the elasticities brings the next stop closer. Raising the elasticities is slow work, but on this evidence it is the only route to growth well above 4 percent that does not end in another programme.

REFERENCES

Araujo, R. A., & Lima, G. T. (2007). A structural economic dynamics approach to balance-of-payments-constrained growth. *Cambridge Journal of Economics, 31*(5), 755–774.

Bai, J., & Perron, P. (1998). Estimating and testing linear models with multiple structural changes. *Econometrica, 66*(1), 47–78.

Bai, J., & Perron, P. (2003). Computation and analysis of multiple structural change models. *Journal of Applied Econometrics, 18*(1), 1–22.

Bairam, E., & Dempster, G. J. (1991). The Harrod foreign trade multiplier and economic growth in Asian countries. *Applied Economics, 23*(11), 1719–1724.

Banerjee, A., Dolado, J. J., & Mestre, R. (1998). Error-correction mechanism tests for cointegration in a single-equation framework. *Journal of Time Series Analysis, 19*(3), 267–283.

Blecker, R. A. (2016). The debate over "Thirlwall's law": Balance-of-payments-constrained growth reconsidered. *European Journal of Economics and Economic Policies: Intervention, 13*(3), 275–290.

Breusch, T. S. (1978). Testing for autocorrelation in dynamic linear models. *Australian Economic Papers, 17*(31), 334–355.

Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society: Series B, 37*(2), 149–192.

Christensen, G., & Miguel, E. (2018). Transparency, reproducibility, and the credibility of economics research. *Journal of Economic Literature, 56*(3), 920–980.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association, 74*(366), 427–431.

Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica, 50*(4), 987–1007.

Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica, 55*(2), 251–276.

Federal Reserve Bank of Minneapolis. (2026). *Consumer price index, 1913–* [Data set]. https://www.minneapolisfed.org/about-us/monetary-policy/inflation-calculator/consumer-price-index-1913-

Felipe, J., McCombie, J. S. L., & Naqvi, K. (2010). Is Pakistan's growth rate balance-of-payments constrained? Policies and implications for development and growth. *Oxford Development Studies, 38*(4), 477–496.

Finance Division. (2022). *Pakistan economic survey 2021–22: Statistical supplement*. Government of Pakistan.

Finance Division. (2025). *Pakistan economic survey 2024–25*. Government of Pakistan.

Gala, P., Rocha, I., & Magacho, G. (2018). The structuralist revenge: Economic complexity as an important dimension to evaluate growth and development. *Brazilian Journal of Political Economy, 38*(2), 219–236.

Godfrey, L. G. (1978). Testing against general autoregressive and moving average error models when the regressors include lagged dependent variables. *Econometrica, 46*(6), 1293–1301.

Gouvêa, R. R., & Lima, G. T. (2010). Structural change, balance-of-payments constraint, and economic

growth: Evidence from the multisectoral Thirlwall's law. *Journal of Post Keynesian Economics, 33*(1), 169–204.

Govt unveils 'Uraan Pakistan' 5-year transformation plan for economy. (2024, December 31). *Dawn*. https://www.dawn.com/news/1882254

Gregory, A. W., & Hansen, B. E. (1996). Residual-based tests for cointegration in models with regime shifts. *Journal of Econometrics, 70*(1), 99–126.

Hansen, B. E. (1992). Tests for parameter instability in regressions with I(1) processes. *Journal of Business & Economic Statistics, 10*(3), 321–335.

Hartmann, D., Guevara, M. R., Jara-Figueroa, C., Aristarán, M., & Hidalgo, C. A. (2017). Linking economic complexity, institutions, and income inequality. *World Development, 93*, 75–93.

Hasan, P. (1998). *Pakistan's economy at the crossroads: Past policies and present imperatives*. Oxford University Press.

Hausmann, R., Hidalgo, C. A., Bustos, S., Coscia, M., Simoes, A., & Yildirim, M. A. (2014). *The atlas of economic complexity: Mapping paths to prosperity*. MIT Press.

Hausmann, R., Hwang, J., & Rodrik, D. (2007). What you export matters. *Journal of Economic Growth, 12*(1), 1–25.

Hidalgo, C. A., & Hausmann, R. (2009). The building blocks of economic complexity. *Proceedings of the National Academy of Sciences, 106*(26), 10570–10575.

Hidalgo, C. A., Klinger, B., Barabási, A.-L., & Hausmann, R. (2007). The product space conditions the development of nations. *Science, 317*(5837), 482–487.

Husain, I. (1999). *Pakistan: The economy of an elitist state*. Oxford University Press.

IMF Independent Evaluation Office. (2002). *Evaluation of prolonged use of IMF resources*. International Monetary Fund.

International Monetary Fund. (n.d.). *History of lending commitments: Pakistan* [Data set]. https://www.imf.org/external/np/fin/tad/extarr2.aspx

International Monetary Fund. (2024). *Pakistan: 2024 Article IV consultation and request for an extended arrangement under the Extended Fund Facility* (IMF Country Report No. 24/310).

Jarque, C. M., & Bera, A. K. (1987). A test for normality of observations and regression residuals. *International Statistical Review, 55*(2), 163–172.

Kaldor, N. (1970). The case for regional policies. *Scottish Journal of Political Economy, 17*(3), 337–348.

Kejriwal, M., & Perron, P. (2010). Testing for multiple structural changes in cointegrated regression models. *Journal of Business & Economic Statistics, 28*(4), 503–522.

Khan, M. S. (1974). Import and export demand in developing countries. *IMF Staff Papers, 21*(3), 678–693.

Khan, S., Azam, M., & Emirullah, C. (2016). Import demand income elasticity and growth rate in Pakistan. *Foreign Trade Review, 51*(3), 201–212.

Kripfganz, S., & Schneider, D. C. (2020). Response surface regressions for critical value bounds and approximate p-values in equilibrium correction models. *Oxford Bulletin of Economics and Statistics, 82*(6), 1456–1481.

Krugman, P. (1989). Differences in income elasticities and trends in real exchange rates. *European Economic Review, 33*(5), 1031–1046.

Kwiatkowski, D., Phillips, P. C. B., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root. *Journal of Econometrics, 54*(1–3), 159–178.

McCombie, J. S. L. (1989). "Thirlwall's law" and balance of payments constrained growth: A comment on the debate. *Applied Economics, 21*(5), 611–629.

McCombie, J. S. L. (1997). On the empirics of balance-of-payments-constrained growth. *Journal of Post Keynesian Economics, 19*(3), 345–375.

McCombie, J. S. L., & Thirlwall, A. P. (1994). *Economic growth and the balance-of-payments constraint*. Macmillan.

Moreno-Brid, J. C. (1999). Mexico's economic growth and the balance of payments constraint: A cointegration analysis. *International Review of Applied Economics, 13*(2), 149–159.

Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. *Applied Economics, 37*(17), 1979–1990.

Newey, W. K., & West, K. D. (1987). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica, 55*(3), 703–708.

Observatory of Economic Complexity. (2026). *Economic complexity rankings* [Data set]. https://oec.world/en/rankings

Pakistan Institute of Development Economics. (2025). *Pakistan's dismal export performance: A survey of empirical literature* (PIDE Working Paper No. 2025:10).

Pal, D., & Mitra, S. K. (2016). Asymmetric oil product pricing in India: Evidence from a multiple threshold nonlinear ARDL model. *Economic Modelling, 59*, 314–328.

Perraton, J. (2003). Balance of payments constrained growth and developing countries: An examination of Thirlwall's hypothesis. *International Review of Applied Economics, 17*(1), 1–22.

Perron, P. (1989). The great crash, the oil price shock, and the unit root hypothesis. *Econometrica, 57*(6), 1361–1401.

Pesaran, M. H., & Shin, Y. (1999). An autoregressive distributed lag modelling approach to cointegration analysis. In S. Strøm (Ed.),

Econometrics and economic theory in the 20th century: The Ragnar Frisch centennial symposium (pp. 371–413). Cambridge University Press.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289–326.

Phillips, P. C. B., & Hansen, B. E. (1990). Statistical inference in instrumental variables regression with I(1) processes. *Review of Economic Studies, 57*(1), 99–125.

Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika, 75*(2), 335–346.

Prebisch, R. (1950). *The economic development of Latin America and its principal problems*. United Nations.

Ramsey, J. B. (1969). Tests for specification errors in classical linear least-squares regression analysis. *Journal of the Royal Statistical Society: Series B, 31*(2), 350–371.

Raza, B. (2021). *Balance of payments constrained growth in Pakistan: Implications for development policy* (SBP Working Paper No. 107). State Bank of Pakistan.

Razmi, A. (2016). Correctly analysing the balance-of-payments constraint on growth. *Cambridge Journal of Economics, 40*(6), 1581–1608.

Rodrik, D. (2016). Premature deindustrialization. *Journal of Economic Growth, 21*(1), 1–33.

Romero, J. P., & McCombie, J. S. L. (2016). The multi-sectoral Thirlwall's law: Evidence from 14 developed European countries using product-level data. *International Review of Applied Economics, 30*(3), 301–325.

Romero, J. P., & McCombie, J. S. L. (2018). Thirlwall's law and the specification of export and import functions. *Metroeconomica, 69*(2), 366–395.

Shin, Y., Yu, B., & Greenwood-Nimmo, M. (2014). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In R. C. Sickles & W. C. Horrace (Eds.), *Festschrift in honor of Peter Schmidt* (pp. 281–314). Springer.

Singer, H. W. (1950). The distribution of gains between investing and borrowing countries. *American Economic Review, 40*(2), 473–485.

State Bank of Pakistan. (n.d.). *Workers' remittances* [Data set]. https://www.sbp.org.pk/Ecodata/homeremmit/Remittance.pdf

State Bank of Pakistan. (2022). *Annual report 2021–22: Statistical supplement*.

State Bank of Pakistan. (2025a). Balance of payments. In *The state of Pakistan's economy: Annual report 2024–25* (Chapter 5). https://www.sbp.org.pk/reports/annual/aarFY25/Chapter-05.pdf

State Bank of Pakistan. (2025b). *Annual report 2024–25: Statistical supplement*.

Stock, J. H., & Watson, M. W. (1993). A simple estimator of cointegrating vectors in higher order integrated systems. *Econometrica, 61*(4), 783–820.

Thirlwall, A. P. (1979). The balance of payments constraint as an explanation of international growth rate differences. *Banca Nazionale del Lavoro Quarterly Review, 32*(128), 45–53.

Thirlwall, A. P. (2011). Balance of payments constrained growth models: History and overview. *PSL Quarterly Review, 64*(259), 307–351.

Thirlwall, A. P., & Hussain, M. N. (1982). The balance of payments constraint, capital flows and growth rate differences between developing countries. *Oxford Economic Papers, 34*(3), 498–510.

Vogelsang, T. J., & Perron, P. (1998). Additional tests for a unit root allowing for a break in the trend function at an unknown time. *International Economic Review, 39*(4), 1073–1100.

World Bank. (2025). *Pakistan development update: Staying the course for growth and jobs* (October 2025). World Bank.

World Bank. (2026). *World development indicators* [Data set]. https://data.worldbank.org

Zaidi, S. A. (2015). *Issues in Pakistan's economy* (3rd ed.). Oxford University Press.

APPENDIX A

Replication Map and Departures From the Plan

The dataset (version 4, 11 November 2026), its source and change logs, the verification report and the estimation file are available from the corresponding author. The estimation file adds to the dataset the step dummies for the break years and their products with log income or log world income; no value of the dataset was changed. Every statistic in Section 4 was read from an EViews 14 output screen and reproduced independently from the same data with separately written code. Table A1 lists the specification behind each reported model, and Table A2 records each departure from the plan of Section 3 and its reason.

Table A1

Replication Map of the Reported Models

Model	Dependent variable and long-run regressors	Fixed regressors	Sample; maximum lags	Selected model (observations)	Key statistic
Constant parameters (Table 10)					
A1	lnm lny	—	1973–2025; 3, 3	ARDL(2,1) (52)	*F* 2.71
A2	lnx lnz	—	1973–2025; 3, 3	ARDL(1,0) (53)	*F* 1.59
A3	lnmw lny	—	1973–2025; 3, 3	ARDL(1,3) (51)	*F* 1.77
A4	lnxw lnz	—	1973–2025; 3, 3	ARDL(1,0) (52)	*F* 4.46
Structural breaks (Tables 11 and 12)					
B1–B4	Least squares of each trade series on a constant and log income; Bai–Perron test	—	1973–2025; trimming 15%, up to 3 breaks	Dates in Table 11	Scaled *F*, Table 11
C1	lnm lny @fl(d81_lny,0) @fl(d05_lny,0) @fl(d16_lny,0)	d81 d05 d16	1973–2025; 3, 3	ARDL(2,0) (52)	*F* 12.96
C2	lnx lnz @fl(d80_lnz,0) @fl(d91_lnz,0) @fl(d03_lnz,0)	d80 d91 d03	1973–2025; 3, 3	ARDL(1,0) (53)	*F* 6.14
C3	lnmw lny @fl(d80_lny,0) @fl(d87_lny,0) @fl(d05_lny,0)	d80 d87 d05	1973–2025; 3, 3	ARDL(3,2) (50)	*F* 9.28
C4	lnxw lnz @fl(d80_lnz,0) @fl(d05_lnz,0)	d80 d05	1973–2025; 3, 3	ARDL(2,2) (51)	*F* 9.68
Second estimator and stability (Tables 13 and 14)					
D1	FMOLS: lnm lny; lnx lnz; lnmw lny; lnxw lnz	Constant	1973–2025; Bartlett, bandwidth 4	53, 52, 53, 52	Hansen L_c, Table 14
D2	FMOLS on each regime of at least 18 years	Constant	Regime years; Bartlett, bandwidth 3	18 to 25	Table 13
Asymmetry and complexity (Tables 15 and 16)					
E1	lnm y_high y_low	—	1973–2025; 3, 3	ARDL(2,2,0) (52)	Wald *F* 5.03
E2	lnmw y_high y_low	—	1973–2025; 3, 3	ARDL(1,2,2) (52)	Wald *F* 17.33
F1	lnm lny eci_fy c_lny	—	1973–2017; 2, 2	ARDL(2,2,2,0) (43)	*F* 5.56
F2	lnmw lny eci_fy c_lny	—	1973–2017; 2, 2	ARDL(2,0,0,0) (43)	*F* 4.67
F3	lnx lnz eci_fy c_lnz	—	1973–2017; 2, 2	ARDL(1,0,0,0) (45)	*F* 2.84
F4	lnxw lnz eci_fy c_lnz	—	1973–2017; 2, 2	ARDL(1,0,2,0) (43)	*F* 4.68
Robustness (Table 17)					
R2	lnm lny lnq; lnx lnz lnq; lnmw lny lnq; lnxw lnz lnq	—	1973–2025; 3, 3	(2,1,0), (1,1,0), (1,2,1), (1,0,1); 52 each	*F* 2.09, 4.01, 5.02, 4.40
R3	DOLS: as D1	Constant	One lead, one lag	51, 50, 51, 50	Table 17
R4	lnm lny_alt; lnmw lny_alt	—	1973–2025; 3, 3	(2,1) (52); (1,3) (51)	*F* 2.86, 1.43
R5	lnm lny; lnx lnz; lnmw lny; lnxw lnz	—	1973–2019; 3, 3 (lnmw: 2, 2)	(2,2) (46); (1,3) (44); (2,2) (45); (1,0) (46)	*F* 7.19, 1.59, 3.39, 4.36

Note. Variable names are those of the estimation file (Table 4 gives the series). All ARDL models have an unrestricted intercept (Case 3) and lag orders chosen by the Akaike criterion from the maximum shown. In EViews syntax, @fl(v,0) fixes the lag of v at zero, and fixed regressors enter without lags. The R4 volume model was run from the command line as ardl(determ=uconst, deplags=3, reglags=3) lnm lny_alt; the others were specified in the ARDL and COINTREG dialogs with the settings shown.

Table A2

Departures From and Additions to the Plan of Section 3

Plan in Section 3	What was done	Reason	Effect on conclusions
Break models re-estimated by FMOLS	FMOLS estimated on each regime of at least 18 years, without break terms	The first difference of a break interaction jumps by the level of income at the break and dominates the FMOLS correction; trial estimates outside EViews gave wrong signs and, in one case, an R^2 below zero. Decided before any such model was run in EViews	None for the verdicts; five of seven regimes agree with ARDL within one standard error (Table 13)
CUSUM and CUSUM-of-squares tests for the break models	CUSUM reported for the years after the last break; CUSUM of squares not reported for these models	Recursive residuals of a model with break terms exist only after the last break (8 to 21 observations)	None; all four CUSUM paths stay inside the 5 percent band
A model failing the serial-correlation test is re-specified with a longer lag	R5 import model at world prices re-estimated with a maximum lag of two, giving ARDL(2,2)	The automatic choice, ARDL(1,2), failed the Breusch–Godfrey test (p = 0.034)	None; no long-run relation in either version
Unrestricted intercept (Case 3) in every ARDL model	R4 import model on volumes re-run under Case 3	The first output was produced with a restricted intercept (Case 2) by a dialog setting, with F = 2.45	None; F = 2.86 under Case 3, below the lower bound in both
Specification B preferred where the real exchange rate is significant at 5 percent in a long-run relation	Applied to imports at world prices; Specification A kept elsewhere	Only that equation has both a long-run relation and a significant price term	The full-sample ceiling in Table 18 uses its elasticity, 1.38
Complexity elasticities reported as functions of C	Wald tests added at C = −0.24 (FY1973) and −0.93 (FY2017)	To report the implied elasticities with standard errors	Lower panel of Table 16

Note. The plan is that of Sections 3.4 to 3.8, written before estimation. The full record of outputs, with the time of each run and its independent reproduction, is part of the replication material.