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Policy Brief

Petroleum Policy and Natural Gas Exploration and Production in Pakistan*

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Problem and Background

Pakistan's petroleum sector is characterized by the upstream exploration and production of natural gas. Natural gas has been a significant energy source in the country for many decades, accounting for approximately half of the country's energy requirements. Until 2015, all supplies came from indigenous reserves, and natural gas was highly subsidized for consumers from households and the manufacturing industry, making it relatively lower-priced than oil-based fuels and LPG. The demand for natural gas has increased significantly over the past two decades, whereas domestic gas reserves are unable to meet the growing demand. This rising demand is attributed to the introduction of captive power generation in the domestic industry, the increasing use of gas for cooking and heating in residential areas, and the adoption of CNG in the transportation sector.

The upstream sector of Pakistan has lacked substantial gas discoveries over the last few years, both in onshore and offshore areas, resulting in a rapid decline in local natural gas resources. The Ministry of Planning, Development, and Special Initiatives of the Government of Pakistan predicted that natural gas production in the country will decline at a rate of 5 percent annually from 2021 onwards. Natural gas production has declined from 4,016 MMCFD in 2015 to 3,689 MMCFD in 2020. This trend continues, and future projections pose a rather gloomy picture, as shown in the figure below (IEP, 2023).

Previous medium-term development plans (5-year and annual plans) are more rigorously based on natural gas and plans to replace oil with natural gas, thereby increasing gas consumption across various sectors of the economy. Accordingly, SNGPL and SSGC have laid extensive gas distribution infrastructure downstream for the last few decades. To meet the country's ever-rising gas demand, Pakistan began developing import infrastructure in the mid-2010s by establishing LNG terminals at the Karachi seaport. Additionally, pipelined gas import projects will include Turkmenistan-Afghanistan-Pakistan-India (TAPI) and Iran-Pakistan (IP) projects. The gas pipeline projects face specific challenges due to the region's geopolitical situation; therefore, LNG imports are filling the demand–supply gap of natural gas in the country since 2015-16. The imports initially relieved the constrained gas sector in the short term, but soon led to the looming sectoral debt of over Rs 2.5 trillion within a few years.

Domestic gas was seen as a substitute for oil imports. Hence, successive governments extended infrastructure and connections to households, industries, and the transportation sector. Over the past few decades, low wellhead domestic gas prices have led to a decreased incentive for E&P companies to invest in Pakistan's upstream natural gas sector (Jamil, 2012). This study conducted a systematic review of policy documents, academic research, and government reports, shedding light on investment policies from around the globe that contribute to the growth of the

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natural gas sector. It assesses the extent to which contemporary research is incorporated into policy design and implementation. The analysis helps identify key trends and patterns in successful policy design and implementation to solve the issue of energy shortage in Pakistan.

Policy Context and Analysis

Countries adopt different fiscal terms to regulate upstream sector activities, including concessionary systems, service contracts, joint ventures, and production sharing contracts. The choice of specific fiscal terms reflects the policy objectives, geological potential, and market conditions. This choice depends on the country's resource base, domestic market size, regulatory setup, and political and economic status. Pakistan adopted a concessionary tax-royalty system where exploration and production (E&P) companies obtain the rights from the government to explore and produce oil and gas in a specific area. If drilling is successful, the company commercially manages the reserves and pays the agreed-upon taxes and royalties to the government based on production levels and revenue. Pakistan is striving to increase its domestic natural gas production through a comprehensive incentive package that includes specific policies, such as the petroleum policy, the tight gas policy, and the offshore policy.

Public policies regarding petroleum exploration and production significantly impact the output of the upstream sector, which involves the addition of reserves and the exploitation of fossil fuel resources. Drilling exploratory wells and rigs requires huge investments contingent on economic incentives, financial terms such as tax and royalty rates, and other regulations related to quantity and prices. Pakistan's petroleum policy is crucial in devising a pathway to energy security and securing the country's broader energy landscape. As Pakistan strives to increase its domestic natural gas production, challenges remain, including regulatory regimes, business cycles, technological advancements, regional political economy, and climate change. Addressing these challenges remains pivotal to ensuring a stable and secure energy supply. By promoting private sector investments, deregulation, and technological innovation, Pakistan can traverse the intricacies of global energy markets.

This study provides an in-depth analysis of petroleum policies, offering valuable insights for policymakers and stakeholders. Low wellhead domestic gas prices over the past few decades have led to a shortage of natural gas reserves and production in Pakistan. Natural gas demand steadily rises in all sectors due to its economical status as a fuel compared to its substitutes. This review examines the extent of upstream activities in different petroleum policy regimes. Jamil (2012).[1] To put the problem in perspective, the study found a relationship between wellhead gas price and cumulative gas reserves in Pakistan. It found that the looming gas shortage can be alleviated in the short term and eliminated in the long term through an incentivized wellhead price. To put it briefly, the idea is mooted first to take advantage of domestic reserves to ensure competitive consumer prices for gas.

In our review of the policy documents, not a single citation of a local or international study indicates the fallacy of the policy-making process. Various studies have examined the policy bottlenecks hindering investment in the upstream sector, but their findings appear to be disjointed from the policy process. The role of the policy framework is pivotal in determining investment in a regulated environment. Studies suggest a price elasticity of more than one for the gas price in response to the addition of domestic reserves.

[1] Jamil, F. (2012). Different public E&P policies impact natural gas reserves and production in Pakistan. *Resources Policy*, *37*(3), 368-374.

Table 1: Province-wise Natural Gas Sector Indicators (Billion Cubic Feet)

Province	Total Recoverable Reserves	Cumulative Production	Remaining Recoverable Reserves	Gas Production in 2000	Gas Production in 2010	Gas Production in 2020
Balochistan	15,508	13,037	2,471	1015	790	782
Khyber Pakhtunkhwa	2,274	1,505	769	0	205	400
Punjab	3,424	1,900	1,524	149	190	111
Sindh	42,104	25,917	16,187	1078	2877	2314
Pakistan	**63,311**	**42,360**	**20,951**	**2242**	**4063**	**3607**

Economic incentives, primarily the wellhead gas price, determine private investment in exploration, reserves expansion, and production. Price expectations adjust the investment level, and crude price affects investment decisions in exploring and producing from new fields. Natural gas production that is unprofitable at $5 per MMBTU would become profitable for an E&P company at $6 per MMBTU. At a sufficiently high price, regions with poor prospects may also be considered by E&P companies for drilling test wells. Therefore, we can argue that low wellhead prices over the past few years have led to a decline in investment in Pakistan's upstream oil and gas sector. In addition, the declining investment can be viewed within a holistic framework, and government consumer price controls reduce companies' expectations of future returns from production, resulting in a decline in gas production and a reduction in long-term reserves.

Key Findings and Way Forward

Pakistan has a fascinating geodynamic history and a large, prospective basin with a sedimentary area of 827,268 square kilometers. The country has proven reserves of 50 trillion cubic feet (TCF) of Shale and 50 TCF of tight gas, in addition to approximately 20 TCF of conventional gas. The tight and shale gas potential reserves in Pakistan amount to 280 TCF (EIA, 2011).

Identifying the sources of weak private investment in Pakistan's upstream sector is crucial for recovering private investment, which requires a range of policy adjustments to encourage capacity expansion, relax supply-side constraints, and mitigate the perceived risks of investment. There is no silver bullet for the government in the short term to emerge from the crisis. However, appropriate gas pricing indexation can gear up investment and increase exploration activities in the long run. In a nutshell, the gas shortage is a manifestation of the obstructive policy of keeping the wellhead price low and providing hidden subsidies by the public utilities.

Our review and data analysis suggest that the Petroleum Policy of 1994 offers better prospects for investors and is therefore attractive to exploration and production (E&P) companies. Many well-known international oil and gas companies have established operations in the country, and their efforts have been successful. These operators include BP Amoco and Premier from the United Kingdom, BHP from Australia, China Oil from China, OMV from Austria, Petronas from Malaysia, MOL from Hungary, and Shell Oil from the Netherlands. The Petroleum Policy 1994 introduced the mechanism for the expeditious disposal of applications for the grant of exploration licenses, which remained intact in all subsequent policies. The income tax rate set in the 1994 policy was 50–55%. Royalty charged at 12.5% is quite regressive, leaving the investor with too much when producing gas from a field with high yields. The key findings from this review and analysis are summarized below.

- **Domestic gas:** First and foremost, affordability cannot be achieved without increasing domestic gas, which also provides plenty of revenue to the government.
- **Public interest and upstream risk:** The government must design its fiscal system carefully, considering the numerous risks involved in oil and gas exploration to balance its objectives vis-à-vis risks assumed by E&P companies.
- **Rate of return:** International companies can be attracted only if they find the rate of return high relative to other options. Otherwise, finances will flee towards more lucrative destinations.
- **Stability and Predictability**: Investors prefer stable and predictable regimes to mitigate risks.
- **Government Take**: The total revenue the government receives from the sector, including all taxes, royalties, and other payments.
- **Investment Climate**: Fiscal terms must be competitive to attract investment while ensuring fair returns for the host country.
- **Regulatory Framework**: Effective regulations and transparent processes are crucial for successfully implementing any fiscal regime.
- **Incentivizing Offshore Drilling:** Pakistan's offshore gas sector is characterized by *the Makran and Indus basins that cover* a large area. Although the government is offering incentives, more attractive fiscal terms can be provided to get a breakthrough.
- **Research-based policy making:** It is recognized worldwide that policy-driven research and research-guided policy making are vital for development. Therefore, industry–academia linkages need to be strengthened, and research citation culture should be promoted.

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Policy Brief

Disconnect Between Trade Policies and Academic Research: An Analysis of Pakistan's Trade Policy Evolution*

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Problem and Background

Trade policies have a crucial role in determining a country's economic course by impacting income distribution, growth, and export performance. Pakistan's trade policy has changed over time, moving away from protectionist policies and toward more liberalized frameworks that are meant to boost global competitiveness. The changes in trade policies are generally communicated through Strategic Trade Policy Framework (STPF) and other policy documents such and the National Tariff Policy (NTP). The policy documents usually highlight challenges and set out objectives and strategies to address those challenges. At the same time, scholarly research also delves deeper into the underlying causes of trade performance and broader implications of trade policies. However, the recommendations and insights of academic research are rarely utilized or cited in the policy documents. This divergence between the focus of policy document and scholarly research underscores a persistent gap between policy formulation and academic research—suggesting the need for stronger integration of empirical evidence and research findings into the trade policymaking process.

In this context, this study aims to investigate the gap between academic research and trade policies. In addition, it focuses on the important areas of divergence and comprehend their underlying causes by methodically examining academic literature on international trade in context of Pakistan and relevant trade policy documents. The objectives of this study are as follows:

1. To examine the alignment between Pakistan's trade policies and academic research.
2. To identify key areas of divergence in policy documents and academic research
3. To explore underlying causes of divergence in policy documents and academic research of develop actionable recommendations for aligning trade policies with academic insights.

Key Points or Patterns Highlighted from Analysis

The review of literature and recent trade policy documents show a disconnect between the academic research being carried out and the issues and objectives highlighted in the policy documents. Firstly, the Strategic Trade Policy Framework (STPF) 2020–25 and National Tariff Policy 2019-2024 does not cite any academic research that makes it difficult to track whether academic research is utilized in policy formulation or relevance of academic research with respect to the issues bring highlighted by the policy makers.

While a certain level of divergence in areas being focused by academic research and the issues highlighted in policy documents is understandable as a lot academic research is (i) related to methodological issues, (ii) theoretical in nature, or highlight only the issues and problems

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instead of providing policy recommendations. Still there is some policy relevant academic research being carried out that aligns with the issues and objectives that are highlighted in the policy documents. Here's list of academic and policy literature focused on Pakistan that aligns with the core issues and critical enablers or guiding principles as given in STPF 2020–25 and NTP.

Table 1: Academic Research Referenced in Major Trade Policy Documents

Sr. No.	Policy Documents	No of Relevant Research Papers *
1	STPF 2020-25	*PBS, SBP*
2	NTP 2018-2024	*WB (1)*
3	**STPF prior**	*Nil*
4	STPF Prior	*Nil*
5	STPF	*Nil*
6	Textile Policy	*Nil*

Table 1 highlights the extent to which academic research is referenced or utilized in Pakistan's key trade policy documents, including the Strategic Trade Policy Framework (STPF) and the National Tariff Policy (NTP). The findings reveal a significant gap except for limited references for different data sources such as PBS, SBP, and the World Bank in the most recent STPF 2020–25 and NTP 2018–2024. Earlier versions of trade policy frameworks and other key policies, such as the Textile Policy, do not cite or incorporate academic research.

Table 2: Trade Policy Issues and Relevant Research in Pakistan

Sr. No.	Highlighted Issues	No of Relevant Research Papers *
1	*STPF*: **Export competitiveness** constrained by high input costs.	*42*
	NTP: High **tariffs** on raw materials reduce competitiveness.	*21*
2	*STPF*: Inefficient **manufacturing** base.	*851*
	NTP: **Tariffs** used for revenue rather than competitiveness, leading to inefficiencies.	*21*
3	*STPF*: **Investment** discouraged by uncertainty and poor policy coordination.	*1740*
	NTP: Lack of predictable **tariff** regime deters **FDI and Industrialization.**	*02*
4	*STPF*: Difficulty integrating into **GVCs** due to fragmented value chains.	*33*
	NTP: **Tariff anomalies** distort sectoral and value chain linkages.	*0*
5	*STPF*: High **trade costs** and regulatory inefficiencies.	*11*
	NTP: Complex **duty structures** and **SROs** hinder **facilitation**.	*02*
6	*STPF*: Limited **export dynamism** and low consumer trust in pricing.	*421*
	NTP: Excessive **protection** increases domestic prices.	*65*
*Papers on Pakistan containing keywords in titles		

Table 2 provides a structured overview of how academic and policy research in Pakistan aligns with the key trade-related challenges outlined in the STPF and NTP. Each issue listed under the STPF is paired with a corresponding or related issue from NTP, and the table reports the number of research papers that address each. This helps identify where research efforts have been concentrated and where potential gaps may exist.

More generic or broad economic issues tend to have a higher number of research papers, while specific, policy-oriented or technical issues—particularly those related to tariff structures—are less frequently studied. For instance, the issue of *investment and uncertainty* has been addressed in 1,740 research papers. This is a wide-ranging topic that falls under the broader themes of investment climate, governance, and macroeconomic stability—areas that have

traditionally attracted significant academic and policy attention due to their general relevance across sectors and time periods.

In contrast, the corresponding issue of *lack of predictable tariff regime that deters FDI and industrialization* is much more narrowly defined and technical in nature. It focuses specifically on the role of tariff policy in affecting investor confidence. This issue is addressed in **only 2 research papers**, indicating that such targeted, policy-specific concerns are comparatively underrepresented in literature. Similarly, the issue of *use of tariffs as measure of revenue rather than competitiveness has* only **21 research papers** which requires detailed examination of tariff schedules and fiscal policy—a more technical and niche research area.

This pattern suggests that while general challenges like competitiveness, investment climate, and industrial inefficiencies are well-covered, **there is a significant research gap when it comes to specific mechanisms like tariff distortions, duty structures, and sectoral anomalies**. This indicates that academic research is also lacking with respect to addressing policy relevant issues.

Several other areas that have been explored in academic research appear to receive comparatively limited or no direct attention in the existing trade policy documents; these areas reflect broader or emerging themes that may warrant greater consideration in future policy planning. One of these areas include **income distribution.** Academic research emphasizes the uneven impacts of trade liberalization, with studies indicating that it can exacerbate income inequality, particularly in urban areas, while potentially benefiting rural regions. Despite these findings, Pakistan's trade policies fail to address the distributional effects of trade reforms. The Strategic Trade Policy Frameworks and National Tariff Policy lack targeted measures to mitigate the adverse impacts on vulnerable groups.

Another key issue is **trade cost and** literature emphasize that high trade costs, driven by inadequate infrastructure and inefficient administrative processes, remain a significant barrier to export competitiveness. Academic studies highlight the critical need for investment in logistics and streamlined trade facilitation processes to reduce these costs. However, Pakistan's trade policies only partially address these issues, focusing more on tariff adjustments and incentives without addressing the broader structural barriers to efficient trade.

On the other hand, one particularly important and frequently highlighted issue—tariff structure—remains notably underexplored in academic research. The complexity of Pakistan's tariff regime is well-documented in both academic research and policy documents. While research highlights the distortive effects of high and uneven tariffs, policy reforms have been inconsistent. There is limited evidence of a systematic approach to rationalizing tariffs to promote industrial growth. There is a noticeable lack of in-depth research on the tariff structure and on how to undertake rationalization in a way that genuinely supports industrial growth and enhances competitiveness. Additionally, the shift from tariffs as a revenue-generating tool to alternative fiscal measures is inadequately addressed in academic research in terms of the extent of this shift and its impact on economy.

Key Insights / Outcomes

The comparative review of academic research and trade policy documents thus reveals important patterns. Firstly, academic literature in Pakistan has broadly examined themes such as competitiveness, investment climate, and income distribution, while policy documents have repeatedly emphasized export performance, tariff rationalization, and industrial efficiency. Secondly, the lack of systematic referencing of scholarly work in trade policy frameworks suggests that available academic knowledge is not being fully leveraged in policymaking. Other key observations and highlights based on the analysis is given as follows:

i. **Disconnect Between Research and Policy**: Trade policy documents do not cite academic research, indicating a gap in evidence-based policymaking. Some academic studies align with policy issues but are not reflected in policy documents.

ii. **More Research on Broad Issues**: Generic topics like investment climate attract extensive academic attention but more **technical policy issues are understudied**. Specific concerns like tariff structure issues and incentive schemes receive minimal research focus.

iii. **Partial Focus on Trade Costs**: High trade costs are frequently highlighted in academic research, but policy mainly addresses tariffs, not structural barriers like trade costs that affect competitiveness.

iv. **Distributional Impacts Overlooked in Policy**: Academic work also highlights distributional effects of trade, but policy lacks targeted responses and dose not take into account the impacts in terms of consumer welfare and inequalities.

v. **Sparse Research on Key Policy Documents**: Most trade policies, including earlier STPFs and the Textile Policy, have little or no citations making it difficult to assess the extent to which academic research is utilized, if any. There is a need for evidence-based policymaking with stronger integration of empirical research into policies.

vi. **Realignment of Research Priorities Needed**: More relevant and applied academic research is needed on tariffs, regulatory distortions, and facilitation mechanisms.