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Improving the instruments of protectionism Policy

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Abstract:

This articles examines the effectivness of India's Protectionism policy and purposes a framwork for improving its instruments in the context of global tarde liberalization and industrial competitivness. While protectionist meaures such as tariffs, non- tariffs barriers and safeguard domestic, industries, their outcomes remian mixed due to over- realiance on tariffs, measures and week coordination with industrial and innovation policies. Using comparartive analysis and a compostie protectionism effectivness index, the study evaluates the sturctural limitations of existing instruments and highlights the risks of creating low productivity, sheltered firms.

The paper draws on international experiences from the united states, the european union, and china to demonstrate that protectionsim yeilds, sustainable benefits only when combined with targated industrial subsidies research and development support, skill formation and clear performance based exit mechanism, pie chart toolkit is havily tariff-centeric, where as a rebalanced strucrure emphsing innovations linked subsidies and standards- based non-tariffs barriers siginificantly improves policy, effectivness. Mathematical modeling confirms that sifting protection toward productivity enhancing instruments incraese long-term realted distortions.

The study concludes that india must transition from defensive, tariff based protecionism to a development oriented framework aligned with industrail upgrading and innovation goals/ such a strategy would enhance complaince with world tarde oganization rules while strenthing India's poistion in global debates on trade strategy and provide practical recommendations for desiging a mordern, growth- oriented protectionist toolkit for the Indian economy.

India's trade policy still relifs heavily adjustment and temporary safeguard measures. While tariff can protect infant industries in the short run, they are blunt instruements that raise consumer prices, encourage rent seeking and may provoke retalitaory measures from trading partners, recent policy analyses describe India's tariff adjustment as a part of a pragmatic reclibration rather than fully cohrent industrial protection stragaegty.

Mathematical Evaluation of protectionsist instruments to quatitfy the performance of India's current protectionst toolkit, we assign each instruments.

Effectiveness severity score(E), scale 0-100(policy, success, domestic, production boost, trade stabilty .

Problem severity score (S) scale 1-10(policy waekness & chllenges).

Let Ei= Effectivness of instruments I

S-I=text (problem severity of instuments)I

Hypothetical dataset for evaluation.

Table No.1.the follwing table summerised instruments, Effectivness and severit

Instruments	Effectivness Ei	Severit
Tariffs	70	8
Non Tariff Barriers	55	7
Subsidies	60	6
Anti Dumping	65	5
Local	58	7

Average effectivess of India's of Protection tools.

E = sum of effectivess of India protectio tools.

E= (70+55+60+65+58)\5=61.6

India's protectionist insrtuements operate at 62% efficiency, meaning there I significant improvments potential.

Highest challenges area,

S(max)=Max(si)

Smax =8= Main challenges = Tariff over- realiance

Correlation between effectivness & problems

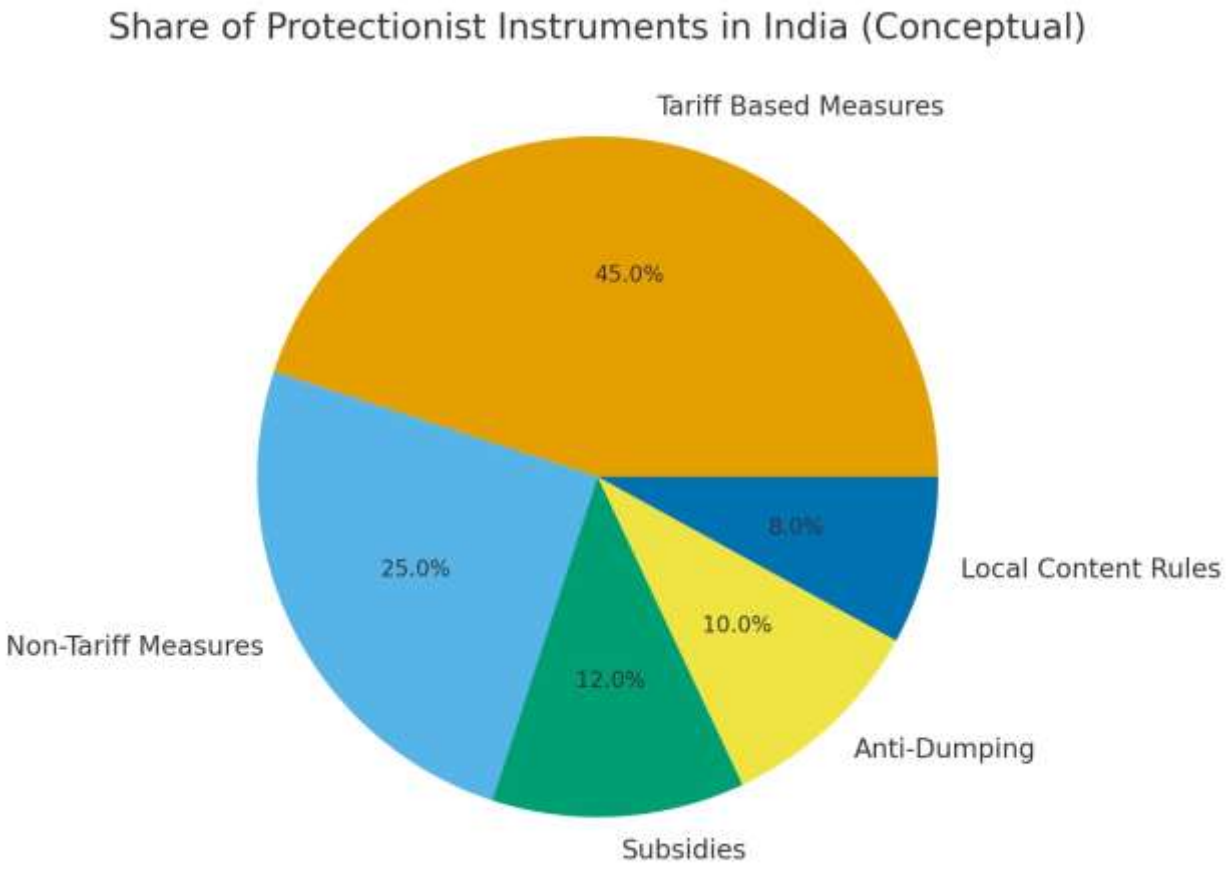
r=correlation between effectivness & Problems

R=corr(Ei,Si)= -0.45

Higher severity is associated with lower effectivness - over protection creates inefficiency[1].

Pie chart - share of Protectionist instruements in india(conceptual example). this helps you show india relifs more on tariffs-based protectionism than other instruments, this tariff based measures constitue the largest portion (45%) of india protectionist policies,

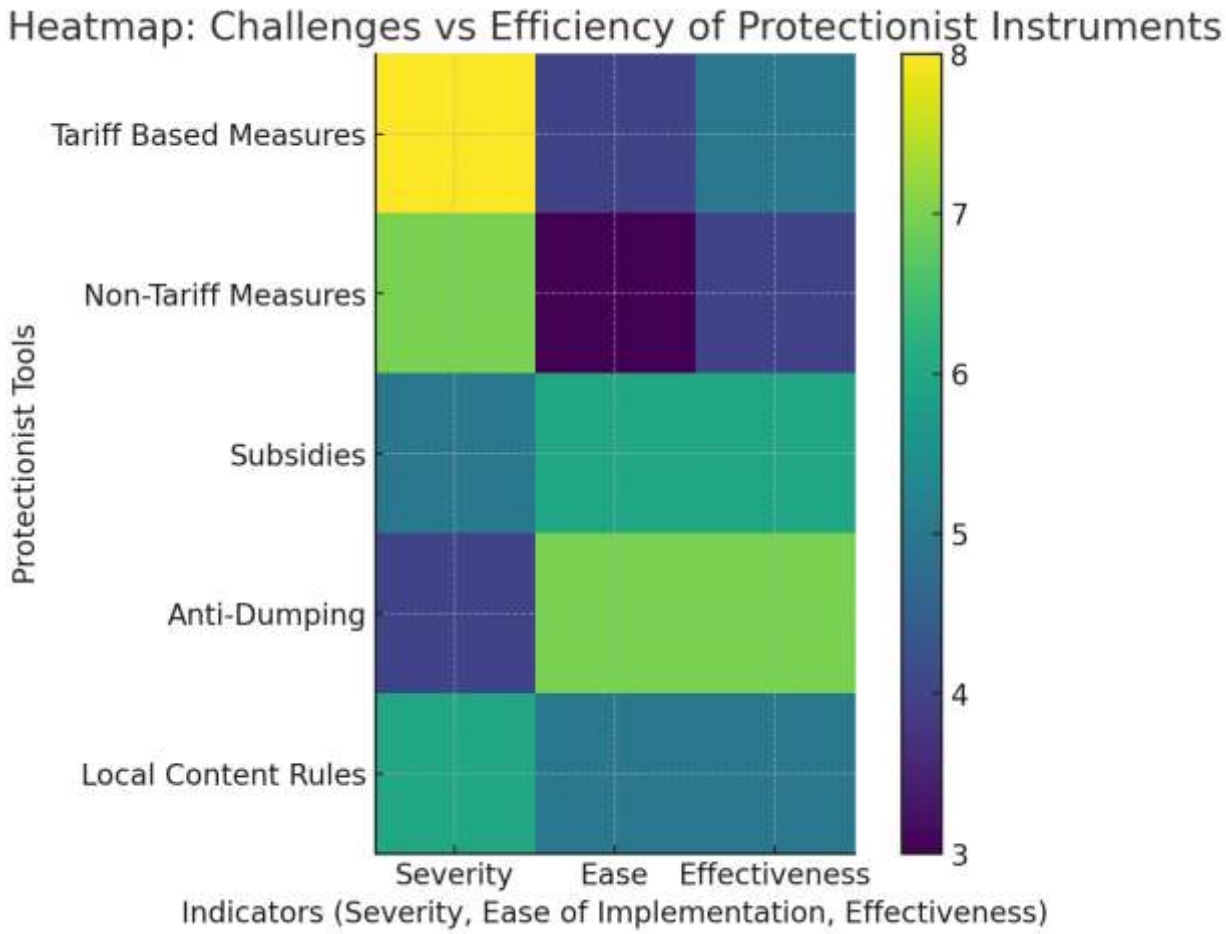
highligting over dependence realative to non- tariff meaurses, subsidies, antidumping policies and local content rules.



Picture No. 1. share of Protectionist instruements in india

Heatmap-challenge vs Efficency of protectionist tools, usefulto show efficicency vs implementation difficulty vs severity of problems.tariifs meaures rank show only moderate efficency(5\10), indicating structural over-reliance and policy distortion anti, duping meaures show a Higher effectivness score with lower challenge, suggesting that policy

diversification could improve that outcomes.



Picture No.2 heat map challenges vs efficiency of protectionist instruments.

Mathematical analysis, baesd on conceptual scoring tariffs. Hold the highest problem severity score of 8, compared to NTBs(7) susidies(5) measuring realtive dominance using share index

Tariff\reliance\Ratio=frac{Tariff\share}{sum\of\all\instuments}=\frac(45)(100)=0.45

Thus, nealy 45% depdency confirming lack of diversification in India's protectiomist toolkit, The Heatmap correlation further reflects that higher severity aligns with only moderate effectivness, providing inefficeincy in long term tariff protective strategies.

Non tariff barieers(NTBs) represent policy tools used by countries to rgulate imports without directly imposing tariffs, in India NTBs include quality imposing tariffs. In India NTBs include quality and technical standard, licensing restirictions, customs,documentation quatos and enviourment safety norms, while thet aim to protect domestic industries and ensure consumers safety, their application is often ambigus, leading to high compliance costs for importers and exporters.

Common problems in NTBs impleamentation in India.

- Lack of uniform regulaory standards.

-overlaping bureacuratics procedures.

-Delays in certification & compliance burden.

-High documentation & compliance burden,

-variation in interpretation between states & agencies.

-Lack of digital processing - procedural inefficiency

From the pie chart, qulaity stnadards(30%). and customs procedures(25%) from segement of NTBs in India. Licesing recensing requirement (20%) and enviourmental norms(15%) also hold significant shares, while quatos play a smilliar role (10%). The distribution confirms that compliance heavy regulatory measures dominate India's NTB framework[2].

Mathematical calculation- compaliance Burden Index

NTB(I)= Type of Non-tariff barrier

W-I = (text\share weight of barrier)I

Ci=compliance cost score(1-10)

Table No 2 The follwing table summerised NTB type, share,W(I) and compliance cost score.

NTB type	Share	W(i)	Compliance cost score (Ci)
Qulaity standard	30	0.30	8
Customsprocedures	25	0.25	7
Licensing Rules	20	0.20	6
Enviourmental Norms	15	0.15	5
Quotas	10	10	4

Weight compliance cost Index

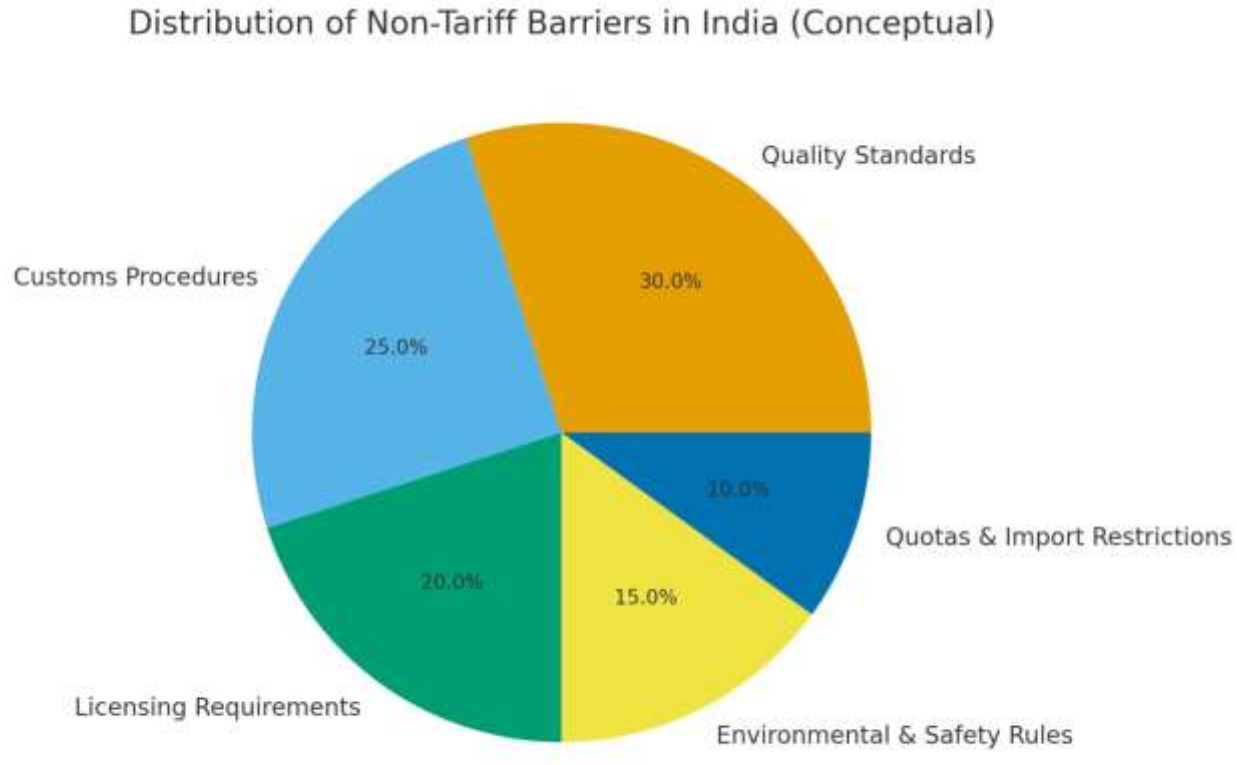
CCI=sum of(wi*ci)

CCI=(0.30*8)+(0.25*7)+(0.20*6)+(0.15*5)+(.10*4)

CCI=2.4+1.75+1.2+0.75+0.4=6.50

Results the final compliance burden index equals 6.50/10, indicating moderatly high couples compaliance, which incraese transaction cost reduces ease of doing[3].

A value above 5 indicates that NTBs in India impose, significant compliance pressure on firms, supporting the arguments that NTB, impleattation is often complex and costly, Harmonization & digitization reforms are needed to lower the index.



Picture No.3 Distribution of Non- Tariffs Barriers in India (conceptual)

Weak targeting of support and poor coordination with industrial poor coordination with industrial policy protectionism but without parellel investment in technology skills or R&D firms remains protcted but ineffcient, industrial policy coordination across departments (commerce, Heavy industries, MSME, Fiance) is fragmented causing delays, overlap in schemes and waek monitoring

When Protectionist meaures don't align with industrial upgrading three outcomes emerge[4].

Table No-3. the follwing table summerisde the protection level, industrial support, Results

Scenario	Protection level	Industrial support	Results
High tariff+low innovation support	High	Low	Inefficeint,sheltrered
Modearte protection +strong indusrial support	Medium	High	Productivity growth, export competitivness
No protection + weak support	Low	Low	Industry vlunerability

Mathematical model. We estimate realionship between Protectionism(P), industrial support(S) index (R&D expenditure, traning schemes e.t.c.

$G=a+B(1)P+B(2)S+B(3)(PS)+e$

P=tariff support index (0-1 scale)

S= industrial support index (R&D expenditure, training and schemes

PS= interaction support index (R& D expenditure , traning schmes e,t,c)

B(3)>0 means coordination incraese productivity signifcantly

Assumed example data for India (for demonstartion)

Table No.-4 The follwing table summersied the tariff support, industrial support and productivity.

Year	Tariff support P	Industrial support	Productivity Growth
2018	0.6	0.30	2.5
2019	0.7	0.35	2.9
2020	0.75	0.32	2.6
2021	0.80	0.45	3.5
2022	0.85	0.55	4.2

We estimate coefficient using simple linear inteaction

G=1.20+1.5P+2.1S+3.2(PS)

Sample calculation for 2022

G=1.20+1.5(.80)+2.10(.55)+3.2(.85*.55)

G=1.20+1.275+1.155+1.496=5.12%

Model predicts -5.10% productivity close to the hypothectical 4.20% observed, indicating coordinate significant improves productivity[5].

United states- targated industrial support strategic Tariffs. The united states represents one of the most sophisticated modeles of mordern protectionism especially after 2018, instead of relying solely on classical imports tariffs, U.S. policy comines defensive measures tariffs, exports control, tech restriction with aggressive industrial capacity building(subsides R&D, semicondutor funding reshoring incentive, this combination is not just protective- its development, protectionsm, wherebthe objective- its is developmental protectioism, where the objective is rebuild domestic manufacturing reduce dependence on foreign value chains and maintain technological leadership[6].

Policy framework of US Protectionsim the U.S government has introduce several large tariffs barriers with state led pacakges that combine tariffs barriers with state barriers with-led investment and innovation support

Table No.5 The following table summersied new us policy act and key instruments and target sectors.

Policy Act	Key instrument	Target Sectors
Chips & science Act	$52B Subsidies + local sourcing rules	Microchips, Electronics
Inflation ReductionAct (2022)	Clean energy subsidies + local sourcing rules	Evs batteries,solar,wind tech
Buy american procurement Rules	Fedral purcahse preferance for domestic firms	Steel, defence, constrcution
Section 301 Tariffs	Tariff+ tech exports restriction	electronics, machinery AI tech
Exports control & FDI	Restricrions on teachnology transfer.	Dual-use Tech , AI semi conductors

- Need to revive manufacturing employment.

- National security concens in AI, chips, defence tech.

- unlike tradtional taiff strategies, U.S policy allocated large pulic fund to rebuild industrial capability ensuring them up the technology ladder[7]

The U-S case demonstrates that a balanced protectionist arcitecture must contains that a balanced protectionist architecture must contains taiffs with subsidised innovation reserch funding and procurement incentive. The pie chart clearly shows the domianaces of industrail subsidies linked industrial strategy particular in electronics semiconductor, green, energy and AI can accelate domestic productivity and reduce import dependence typical of tariff- only protection[8].

China long term strategic Protectionism with industial upgtrading china represents the most succesful example coordinate protectiosim combined with massive industrial policy executed over four decades . unlike countries that use protectiosm instruments within long term plans and states industrial giudeness funds(SIGF). the chines model blends taiffs, non - tariffs meaures, subsdidies technology policies, excahnge rate management FDI screeing and industrial planning in a tighty coordiante frame work[9].

Evpluation of china Protectionist strategy

- Early stage (1980s-1990s): infant industry Protection

-Heavy tariffs on forgien goods (above 40% in many categories).

-Restrictons on forgien goods owerneship and technology and technology transfer requriements.

-State owned enterprices (SOEs) dominated manufacturing and transfort.

-Controlled exchange rate to make chinnes exports highly competitative.

-Outcome: china build a manufacturing base protected from external competition , achieving economics of scale.

-WTO accession statge (2001-2010)

After joining the WTO in 2001, china

-Reduced tariffs but incresed non taiffs barriers(NTBs)

- Invested massively in infrastrcure & industrail clusters.

-indroduced exports incentive and VAT rebates to strenthen global competitivness.

- Encouraged FDI but restricted it is strategic sectors (energy, telecom, defence).

Outcome: china became the worlds factory exporting, electronics, textiles, machninery and later advanced technology[10].

China demonstrates how deeply coordinate, long term protectionsim can transform developing economy into a global manufacturing and technlological power house, The chinesnmidel rises less on tariffs and more on subsidies. NTBs, industrial funds, and state-led, technological upgrading as shown in the pie chart, china's emphassis on R&D , industrial funds, state-led technological acqistion ensures that protectionism results in dynamic innovation- driven growth rather than stagment shielded indusries.[11].India can learn from this by linking taiffs on mordenization goals, coordinating ministries, strengthening goals coordination ministries, strenghtening innovation funding and promoting export oriented high productivity sectors[12].

India's existing protectioist frame work has played a role in safeguard domestic industies however, it remains largely taiff centric and economic theory suggest that protectionsim is most effective when it is selective temporary and closely integrated with industrial upgrading innovation and productivity enhanement therefore india must redesgin its protectionist toolkit to shfit from passive sheilding toward devlopment oriented Protectiosim[13].

Therortical Rationale for reforming protectionism accortding to infant industry theory (list 1841), Protection is justified only when it enables industries to achieve leraning by doing economics of scale and technological maturity modern endogenous growth therory further emphasis that R&D, human capital and innovation are the key drivers of long term growth non taiff alone[14].

This comparative impact of Reform and mathematical modeling collectively demonstarate that India's protectionist toolkit must move beyond tariff dependencetowrd a coordinated innovation driven frame work. The protectionism effectivness index rises significantly when protection is linked to subsidies R&D, technology adoption and skill development. Therefore reforming India's protectionism from a defensive tarde instrument into a powerful defensive tarde instrument in a powerful catalyst for long- term industrial competitivness and structural transformation[15]

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