Setting Commercial Tax Targets for FY 2011-12: An Experiment for Government of Bihar

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Regional Composition of Growth in Bihar's Sales Tax Collection (2006-07 to 2009-10)

District	Contribution to Total growth in VAT collection	Average (%)Share of Total VAT collection	Annual Variation in VAT collection (CV)
Patna (75.99)	75.99	85.51	25.47
1% to <=3% Vaisali (2.16), Muzaffarpur(1.87), Darbhanga(1.49),W. Champaran(1.46), Purnea(1.26), Gaya(1.25), Katihar(1.13), Nalanda(1.10), Rohtas(1.09)	12.81	6.8	39.09
0.5% to <= 1% Begusarai (1.00), Saharsa (0.95), Saran (0.74), Aurangabad (0.72), Siwan (0.71), Bhagalpur + Banka (0.69), E. Champaran(0.64), Sheohar + Sitamarhi (0.63), Munger (0.55), Madhubani (0.55)	7.19	4.45	36.26
0% to <= 0.5% Jehanabad + Arwal (0.50), Bhojpur (0.46), Gopalganj (0.43), Jamui (0.41), Madhepura +Supaul (0.36), Kaimur (0.31), Khagaria (0.30), Nawada (0.26), Samastipur (0.24), Lakhisarai + Sheikhpura (0.24), Buxar (0.22), Araria (0.15), Kishanganj (0.13)	4.01	3.24	30.25
Total (100)	100.00	100.00	28.16

Regional Composition of Economic Growth in Bihar during 2006-07 to 2009-10

District	Contribution to Total Growth (%)	Average (%) Share of GSDP	CV
Single largest Contribution **Patna** (23.72)	23.72	24.09	12.37
4 %-5% Contribution Muzaffarpur (4.84), Bhagalpur (4.72), Madhubani(4.09)	13.64	12.3	13.6
3% - 4% Contribution Begusarai (3.8), Madhepura (3.42), Gaya(3.26), E. Champaran (3.26), Darbhanga (3.25), Saran (3.16) Rohtas(3.09), Katihar (3.06)	26.3	23.75	13.59
2% - 3% Contribution Purnia (2.74), Vaishali(2.54), Nalanda(2.37), W. Champaran (2.27), Bhojpur(2.05), **Samastipur** (2.04), Jehanabad(2.02)	16.03	17.48	11.67
1% - 2% Contribution Araria (1.9), Sitamarhi (1.89), Saharsa(1.88), Munger (1.84), Aurangabad (1.55), Gopalganj (1.55), **Khagaria** (1.46), Nawada (1.33), Kaimur(1.26), Kishanganj (1.26), Buxer(1.24), Jamui(1.17), Lakhisarai (1.13)	19.46	19.64	12.41
0 – 1% Contribution Siwan (0.85)	0.85	2.6	7.71
Total (100)	100	100	12.22

Table 1.2:   Change in buoyancy (in real terms) during Pre-VAT & Post VAT regime

Change in buoyancy during Pre-VAT & Post VAT regime	Districts
Marginal Increase in elasticity	Khagaria ,Patna, Samastipur
Decline	Bhagalpur + Banka, Sheohar + Sitamarhi, Araria , Bhojpur , Darbhanga , Madhubani, Kisanganj, West Champaran , Aurangabad , Jehanabad + Arwal, Katihar , East Champaran , Muzaffarpur, Madhepura +Supaul, Nawada, Buxar , Lakhisarai + Sheikhpura, Saharsa, Begusarai , Nalanda, Rohtas, Saran, Gaya , Kaimur, Vaishali , Siwan , Munger, Purnea, Jamui , Gopalgang

Spread of Tax Buoyancy

Tax Buoyancy estimate (from 2001-02 to 2009-10)	Districts
More than 1.3	Katihar , Jehanabad + Arwal, Madhepura +Supaul, Jamui , Sheohar + Sitamarhi
1.1 to 1.3	Madhubani, Bhojpur , Aurangabad , Saran, Muzaffarpur, Kisanganj, Saharsa, Darbhanga , Nalanda , Vaishali
1 to 1.1	West Champaran , Purnea, Munger, Rohtas, Araria , Nawada, **Patna**, Buxar , Kaimur, Gopalgang
0.5 to 1.0	Lakhisarai + Sheikhpura, Bhagalpur + Banka, East Champaran , **Samastipur**, Gaya **, Khagaria** , Siwan , Begusarai

The Context

- There was no buoyancy enhancing structural break in Bihar's tax-revenue mobilisation between 1981 and 2003 (Rajaraman et al 2005).

- Post-2001 growth sectors of the Bihar economy are the 'integrated' sectors with the growth miracle explained by contributions of four sectors – trade hotel and restaurant, real estate, communication, construction (Das Gupta 2010).

- State finances have increasingly become dependent on transfers from the union government (close to 72-75 percent in last three years compared to 40 percent in 2003-04) despite the 'growth miracle' (Economic Survey of Bihar 2009-10).

- Bihar's Tax-GSDP ratio is around 5 percent despite double digit economic growth in last four to five years (Ibid).

- As per the Indian Constitutional arrangements, state governments have no power over design of direct tax.

Aim of the study

- This experiment is a indicative exercise for setting of commercial tax targets for FY 2011-12 based on economic rationale and administrative feasibility to achieve the aim of aligning resource mobilisation efforts to economic growth

Design

- Exercise of setting the target is based on a panel data comprising of district-level commodity wise commercial tax collection, dealer information and district level sectoral GDP for the last five years using simple regression techniques to achieve the overall aim of the state government to increase its tax-GSDP ratio.

- The experiment is based on three sets of indicators:
  i. Structure of the district's economy and its consumption base which would determine its taxable consumption base
  ii. The room for increasing administrative efficiency taking on board the constraints of path dependency
  iii. The impact of the revised VAT of 2005 on collections in the past five years despite (i) and (ii) above

Economic Rationale

The traditional supply-side rationale behind VAT has been focussed on commodity sales in the non-agricultural sector and the volume of value-additions in the multi-stage production process. However, tax potential in a predominantly rural agrarian economy like Bihar with sales and purchases being concentrated in small trading hubs at the district level mainly depends on the following:

- Agricultural income which determines extent of purchasing power across social classes and thus determines the extent of rise in demand for private non-food commodity consumption.

- Growth in major non-agricultural sectors which determines volumes of taxable transactions in the economy, but not necessarily involving many stages of value-addition. Since most goods are produced in other states and sold in Bihar, the impact of VAT tends to be largely similar to that of sales tax.

- These two factors together determine what can be termed the quantum of 'growth effect' on the tax base.

- However, there are two other factors which often tend to have a more determining role in the levels of actual tax collection. These are:

- The role of the tax administration determined by complex institutional factors in mobilising tax resources in a particular tax administration unit or circle.

- The inherent efficiency of VAT as an incentive based tax which leads to higher tax mobilisation.

For this experiment, the following datasets have been used:

- Projections of district level sectoral GDP figures (1999-2000 series) based on data from Directorate of Statistics and Evaluation, Government of Bihar.

- Estimates of state level sectoral GSDP figures (1999-2000 series) based on data from Directorate of Statistics and Evaluation, Government of Bihar.

- Circle wise and commodity wise commercial tax collection figures (2006-07 to 2009-10) based on actual figures sourced from the Department of Commercial Tax, Government of Bihar.Tax circle wise collection figures are mapped on to districts to enable analysis of growth impact.

- We measure the composite impact of both trend annual changes (real growth/decline) in collection for each category for the period 2006-07 to 2009-10; as well as the relative share   of each category in the total VAT/Bihar Sales Tax pool of Bihar.

- We measure buoyancy trends at the district level for the period under consideration after adjusting for inflation.

Mapping of tax circle with districts

- Tax circle wise collection figures are mapped on to districts to enable analysis of growth impact. District wise GDP figures are mapped one-to-one with the district wise tax collection figures except Bhagalpur, Banka, Jehanabad, Arwal, Madhepura, Supaul, Lakshisarai, Sheikhpura, Sheohar and Sitamarhi because in some cases, more than one districts is clubbed within a single circle. For example, Bhagalpur and Banka fall under Bhagalpur Circle, Lakshisarai and Sheikhpura fall under Lakshisarai Circle, Jehanabad and Arwal fall under Jehanabad circle, Madhepura and Supaul fall under Madhepura circle, Sitamarhi and Sheohar fall under Sitamarhi circle.

- Department of Commercial Tax, Government of Bihar provides circle wise tax collection figures along with the corresponding districts which help to map the GDDP figures with respective tax collection figures. In the tax collection figures some districts consist of more than one tax circle for e.g. Bettiah and Bagaha circle fall under West Champaran district. The circle wise tax figures are then added to derive the district figure.

- For districts like Patna, Madhubani, Muzaffarpur, Begusarai, West Champaran and East Champaran which consist of more than one circle, we cannot provide circle level computation of growth effects as GDP numbers are not generated at the sub-district level.

- To do a robust exercise, a field based study within a district to measure variations in inter-circle sales of major commodities can be attempted.

- However, for our purpose, district level computations are sufficient for indicative results.

Method

- *Estimating the Growth Effect on Tax Collection*

Step I

- For each district, agricultural growth factor is calculated by multiplying trend growth rate of agriculture with average sector share of agriculture. The ratio of this product to trend growth rate of agriculture in Bihar is the first indicator of the relative importance of agricultural growth on the districts tax base:

- Thus AGF for i^{th} district is

- $AGF_i = (G^i_{agr} * W^i_{agr}) / G_{agr}$

- where

- G^i_{agr} = Trend growth rate of agriculture in i^{th} district

- W^i_{agr} = Average sector share of agriculture in the district's economy

- G_{agr} = Trend growth of agriculture in the state.

Step II

To estimate the growth effect from non-agricultural sectors*, a **Non-Agricultural Composite Growth Factor (NACGF)** is calculated as follows:

- For each district, the contribution of the major sectors which explain the economic growth pattern of the district and thus are indicative of the volume of taxable transactions is calculated as follows:

$$NACGF_i = (G^i_{comp} * W^i_{comp}) / G_{comp}$$

G^i_{comp}= Trend growth rate of output in manufacturing, trade, construction, electricity, transport & storage, communication, real estate and public administration in ith district

W^i_{comp} = Average sector share of the above in the district's economy

G_{comp} = Trend growth of the output in the sectors mentioned above in the state.

* These sectors viz. manufacturing, trade, construction, electricity, transport & storage, communication, real estate and public administration have been identified on the basis of the investigators' earlier work on Bihar's growth which show that these sectors together determine more than 90 percent of Bihar's annual growth (Das Gupta 2010)

Growth Effect: Tax Base and Tax Net

The final values for AGF and NACGF are then calculated by multiplying with tax buoyancy factor at district level for 2009-10 to derive the final indicator of impact of growth on tax net.

Step III

Appendix I shows the lack of correlation between aggregate growth and tax elasticity at the district level in Bihar. Once the disaggregated growth factors contributing to tax potential is estimated in Steps 1 and 2, the importance of VAT performance at the district level can be isolated by the relative shares of each district in the state's total tax collection in the post-VAT period in which dealer registration shows a significant increase.
This is estimated by:

$VATF_i$ = Share of VAT in total commercial tax collection in i^{th} district

TAF_i = Average share of District i in total tax collection which is demonstrated to be a function of volatility of annual collection in district i

Classification of districts according to Volatility of Commercial tax collection (2006-07 to 2009-10)		Classification of districts according to Volatility of GDDP (2001-02 to 2006-07)	
High Volatility (Above 51)	Begusarai (126) /Madhepura +Supaul (98) /Araria (97) /Buxar (95) /Kaimur (94) /Bhojpur (80)/Samastipur (78) /Saran (76) /Katihar (73) /Sheohar + Sitamarhi (60) /Nawada (58) /Nalanda (57) /Saharsa (56)	High Volatility (Above 145)	Madhubani (317) /Sheohar (240) / East Champaran (224) /Supaul (223) /Bhojpur (216) /Samastipur (206) /Sitamarhi (204) /Katihar (202) /Begusarai (198) /Aurangabad (175) /Vaishali (171) / West Champaran(152) /Siwan (149)
Average Volatility (40-51)	Munger (51) /Aurangabad (51) / W. Champaran (46) /Gopalganj (45) / Purnea (42) /Bhagalpur + Banka (41) /Kishanganj (41)	Average Volatility (130 to 145)	Kaimur (148) /Madhepura (144) / Jamui (136) /Nawada (133)
Low Volatility (less than 40)	Lakhisarai + Sheikhpura (39) / Jehanabad + Arwal (34) / Madhubani (33) /Darbhanga (31) /Vaishali (26) /Gaya (25) /Rohtas (24) / E. Champaran (23) / Siwan (22)/Khagaria (19)/Muzaffarpur (16) /Jamui (7)/ Patna (4)	Low Volatility (Less than 130)	Arwal (130) /Muzaffarpur (130) /Gopalgang (128) /Darbhanga (127) /Jehanabad (126)/Buxar (116) / Saharsa (114)/Gaya (109) / Sheikhpura (105) /Nalanda (105)/ Lakhisarai (104) /Banka (91)/Saran (87)/Purnia (86)/ Munger (85) / Patna (85)/Kisangang (84) /Rohtas (82) /Araria (70) /Bhagalpur (54) / Khagaria (38)

We examine the factors specified above using Principal Component Analysis to identify the variables or factors that explain the pattern of correlations within the set of specified variables in the earlier steps along with other variables like

Share of agriculture in district product (AGR_i/GDP_i for the ith district)

$NVATF_i$ = Share of district i in commercial taxes other than VAT

The results after multiple iterations are summarised in Appendix IIC which show that the four variables summarised earlier explain 99.8 percent of the inter-district variations in tax collection.

The four indicators chosen by us explains 98.7 percent variations in tax collection among districts in Bihar (see regression results in paper)

Based on these results, we put forward the proposition that for district i, mean collection over the period of analysis (2006-07 to 2009-10) can be represented as

$TC_i = AGF_i*x_{1i} + NACGF_i*x_{2i} + VATF_i*x_{3i} + TAFi*x_{4i} + e_{ij}$

Where $AGF_i + NACGF_i + VATF_i + TAFi = 100$

And x_{ji} (j = 1, 2, 3, 4) represents the contribution of each of the above factors to total tax potential of ith district.

Setting the Target for FY 2011-12

Scenario 1: The Principal Secretary, Department of Commercial Tax, had indicated to the investigators that he would like to aim at a Sales and Commercial Tax-GSDP ratio of 4 percent for FY 2011-12. This would imply an overall target of Rs 9578 crore from Sales and Commercial Tax including VAT.
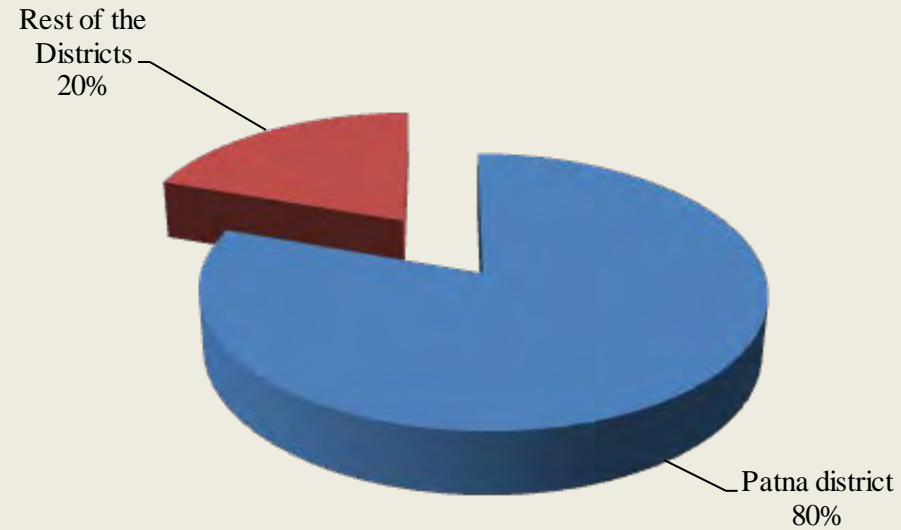
Scenario 2: Our study of trend growth rates of collections indicate that if there is no change in either the patterns of economic growth or the annual elasticity of district level tax collection, the overall target for 2011-12 cannot be more than Rs 8471 crore.

Using the steps outlined in method section, we present district-wise targets for VAT and other commercial taxes for FY 2011-12 for Scenarios 1 and 2 respectively in tables below.
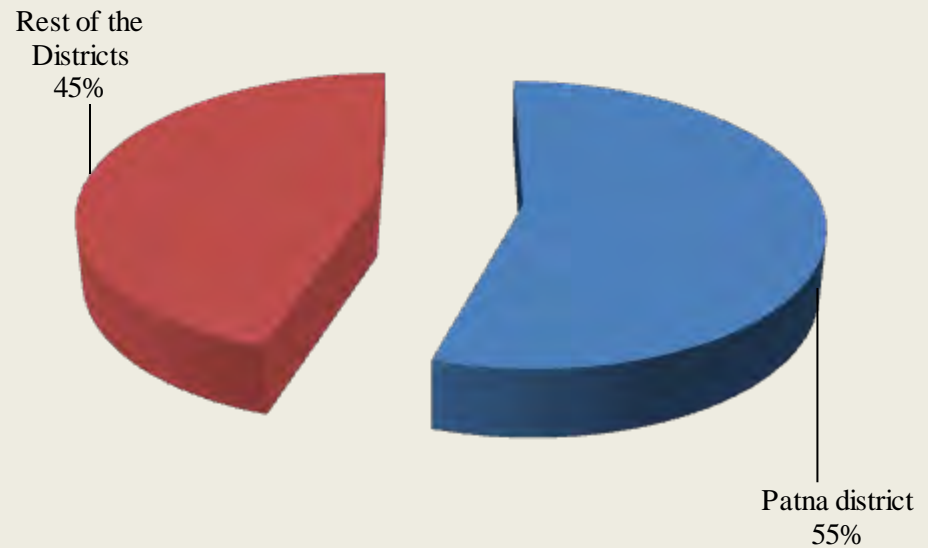
Note: these targets assumed no change in tax rates, but VAT rates have been hiked from April 1, 2011.

Change in skew of tax collection share for both scenarios I and II

2009-10

Rest of the
Districts
20%

Patna district
80%

2011-12

Rest of the
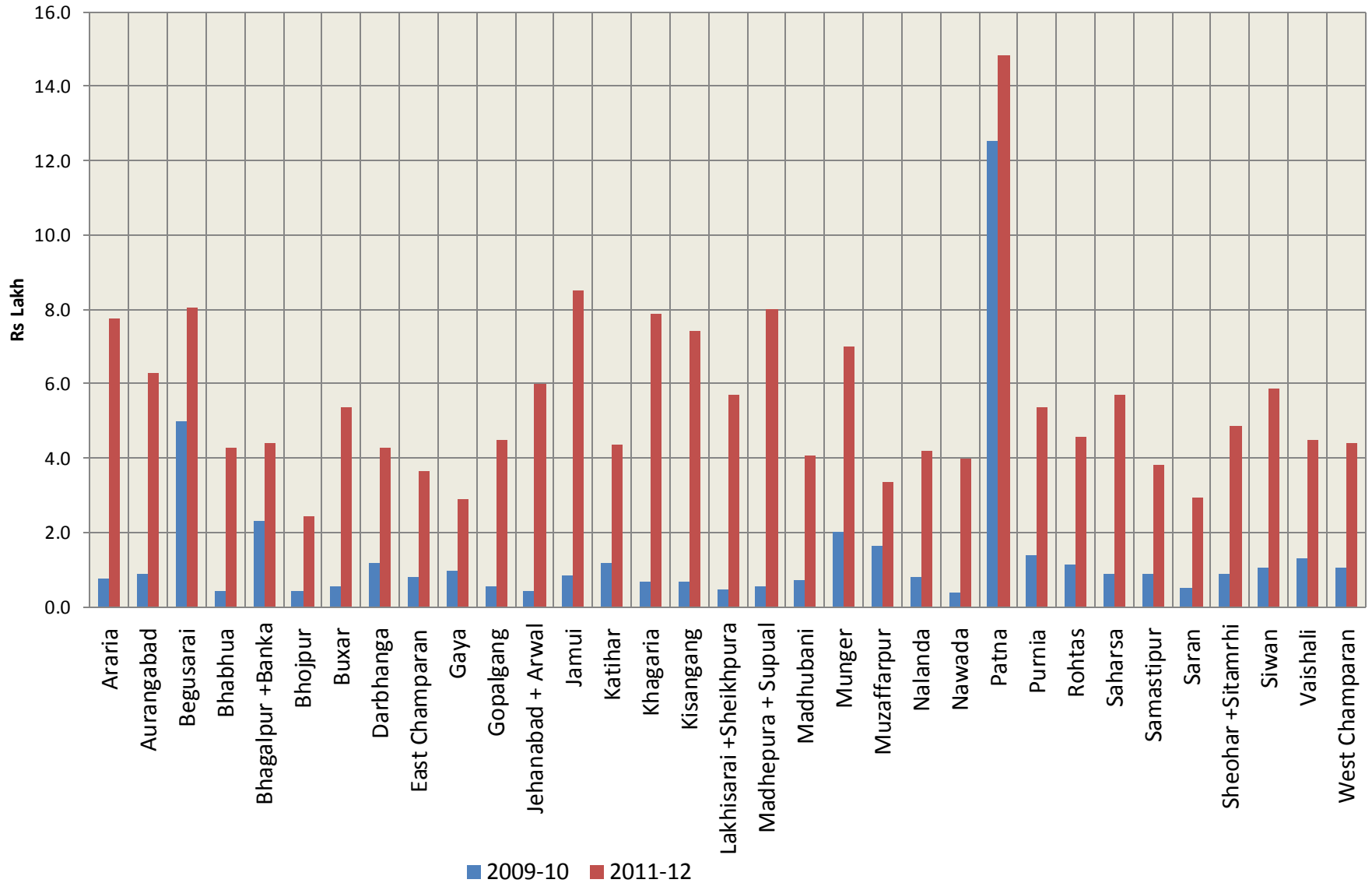Districts
45%

Patna district
55%

Classification of circles/districts according to increase in VAT target in FY 2011-12 compared to FY 2009-10 under Scenario I

Increase in VAT target (Rs crore)	Tax Circles/Districts
Very high increase (More Than Rs 200 crore)	Patna (576 cr.)
High increase (Rs 95 crore to Rs 200 crore)	Jehanabad +Arwal (95 cr.) / Madhepura + Supual (95 cr.)
Moderate increase (Rs 85 to Rs 94 crore)	Gopalgang (93cr.) /Saharsa (93 cr.) /Buxar (91 cr.) /Nawada 89 cr.) /Saran (87 cr.) /Darbhanga (86 cr.) / Sheohar +Sitamrhi (85 cr.)/West Champaran (85 cr.) / Nalanda (85 cr.)
Less increase (Rs 65 crore to Rs 84 crore)	Madhubani (84 cr.)/Siwan (84 cr.) / Aurangabad (83 cr.) /Khagaria (82 cr.)/Jamui (82 cr.)/Lakhisarai +Shikhpura (82 cr.)/Vaishali (81 cr.)/Rohtas (80 cr.)/ Muzaffarpur (78 cr.)/East Champaran (75 cr.)/Bhojpur (75 cr.)/ Katihar (74 cr.)/Bhabhua (72 cr.)/Kisangang (71 cr.)/ Purnia (68 cr.)/Gaya (67 cr.)/Araria (67 cr.)/ Samastipur (67 cr.)
Very less increase (less than Rs 65 crore)	Munger (31 cr.)/Bhagalpur +Banka (28 cr.) / Begusarai (14 cr.)

Classification of circles/districts according to increase in target of other taxes in FY 2011-12 compared to FY 2009-10 under Scenario I

Increase in target of Other taxes (Rs crore)	Tax Circles/Districts
Very high increase (More Than Rs 90 crore)	Patna (228 cr.)/ Begusarai (112 cr.)
High increase (Rs 40 crore to Rs 90 crore)	Bhagalpur + Banka (88 cr.)/ Munger (72 cr.)
Moderate increase (Rs 26 to Rs 39 crore)	Samastipur (38 cr.)/Gaya (36 cr.)/ Muzaffarpur (34 cr.)/Purnea (33 cr.)/ Araria (30 cr.)/Bhabua (28 cr.)/ Katihar (26 cr.)
Less increase (Rs 14 crore to Rs 25 crore)	E. Champaran (25 cr.)/Kishanganj (25 cr.)/ Bhojpur (24 cr.) / Vaisali (23 cr.)/ Rohtas (21 cr.)/ Siwan (19 cr.) / Aurangabad (17 cr.)/W. Champaran(17cr.)/ Nalanda (16 cr.) / Khagaria (15 cr.)/ Jamui (15 cr.) / Darbhanga (15 cr.)/Lakhisarai + Sheikhpura (15 cr.)/ Madhubani (14 cr.)/Sheohar + Sitamarhi (14 cr.)
Very less increase (less than Rs 14 crore)	Saran (12 cr.)/ Buxar (10 cr.)/ Nawada (7 cr.)/ Gopalganj (6 cr.)/Saharsa (5 cr.)/ Jehanabad + Arwal (2 cr.)/Madhepura +Supaul (1 cr.)

Comparison of Commercial Taxes collected per dealer (2009-10) and Expected collection of Commercial Taxes per dealer (2011-12) under Scenario I

Legend: ■ 2009-10 ■ 2011-12

Y-axis: Rs Lakh (0.0 to 16.0)

X-axis categories: Araria, Aurangabad, Begusarai, Bhabhua, Bhagalpur +Banka, Bhojpur, Buxar, Darbhanga, East Champaran, Gaya, Gopalgang, Jehanabad + Arwal, Jamui, Katihar, Khagaria, Kisangang, Lakhisarai +Sheikhpura, Madhepura + Supual, Madhubani, Munger, Muzaffarpur, Nalanda, Nawada, Patna, Purnia, Rohtas, Saharsa, Samastipur, Saran, Sheohar +Sitamrhi, Siwan, Vaishali, West Champaran

Classification of circles/districts according to increase in VAT target in FY 2011-12 compared to FY 2009-10 under Scenario II

Increase in VAT target (Rs crore)	Tax Circles/Districts
Very high increase (More than Rs 90 crore)	Patna (141 cr.)
High increase (Rs 73 crore to Rs 90 crore)	Jahanabad + Arwal (83 cr.) /Madhepura + Supual (83 cr.) /Gopalgang (81 cr.)/Saharsa (80 cr.) /Buxar (79 cr.) /Nawada (78 cr.) / Saran (75 cr.)/Sheohar +Sitamrhi (73 cr.) /Darbhanga (73 cr.)
Moderate increase (Rs 62 to Rs 72 crore)	Nalanda (72 cr.)/ Madhubani (72 cr.) /Siwan (72 cr.) /Aurangabad (72 cr.) /West Champaran (72 cr.) /Khagaria (72 cr.)/Lakhisarai +Sheikhpura(71 cr) /Jamui (71 cr.) /Vaishali (68 cr.) / Rohtas (67 cr.)/ East Champaran (64 cr.)/ Bhojpur (64 cr.) /Bhabhua(63 cr.) /Kisangang (62 cr.) / Katihar (62 cr.)
Less increase (Rs 61 crore to Rs 40 crore)	Muzaffarpur (60 cr.) /Araria (58 cr.)/Purnia (57 cr.) /Samastipur (57 cr.) /Gaya (56 cr.)
Very less increase (less than Rs 40 crore)	Munger (26 cr.)/Bhagalpur +Banka (21 cr.) / Begusarai (10 cr.)

Classification of circles/districts according to increase in target of other taxes in FY 2011-12 compared to FY 2009-10 under Scenario II

Increase in target of Other taxes (Rs crore)	Tax Circles/Districts
Very high increase (More Than Rs 50 crore)	Begusarai (78 cr.)/ Bhagalpur + Banka (66 cr.)/Munger (60 cr.)/Patna (56 cr.)
High increase (Rs 29 crore to Rs 50 crore)	Samastipur (32 cr.)/ Gaya (30 cr.)
Moderate increase (Rs 16 to Rs 28 crore)	Purnea (28 cr.)/Muzaffarpur (27 cr.)/Araria (26 cr.) /Bhabua (24 cr.)/Katihar (22 cr.)/Kishanganj (22 cr.)/E. Champaran (21 cr.)/Bhojpur (21 cr.)/Vaisali (20 cr.) /Rohtas (18 cr.)/Siwan (16 cr.)
Less increase (Rs 8 crore to Rs 15 crore)	Aurangabad (14 cr.)/ W. Champaran (14 cr.)/ Nalanda (13 cr.) / Khagaria (13 cr.)/Jamui (13 cr.) / Lakhisarai + Sheikhpura (13 cr.) / Darbhanga (12 cr.)/ Madhubani (12 cr.) /Sheohar + Sitamarhi (12 cr.)/ Saran (11 cr.)/Buxar (8 cr.)
Very less increase (less than Rs 8 crore)	Nawada (6 cr.)/ Gopalganj (5 cr.)/Saharsa (5 cr.) /Jehanabad + Arwal (2 cr.)/ Madhepura +Supaul (1 cr.)

Comparison of Commercial Taxes collected per dealer (2009-10) and Expected collection of Commercial Taxes per dealer (2011-12) under Scenario II
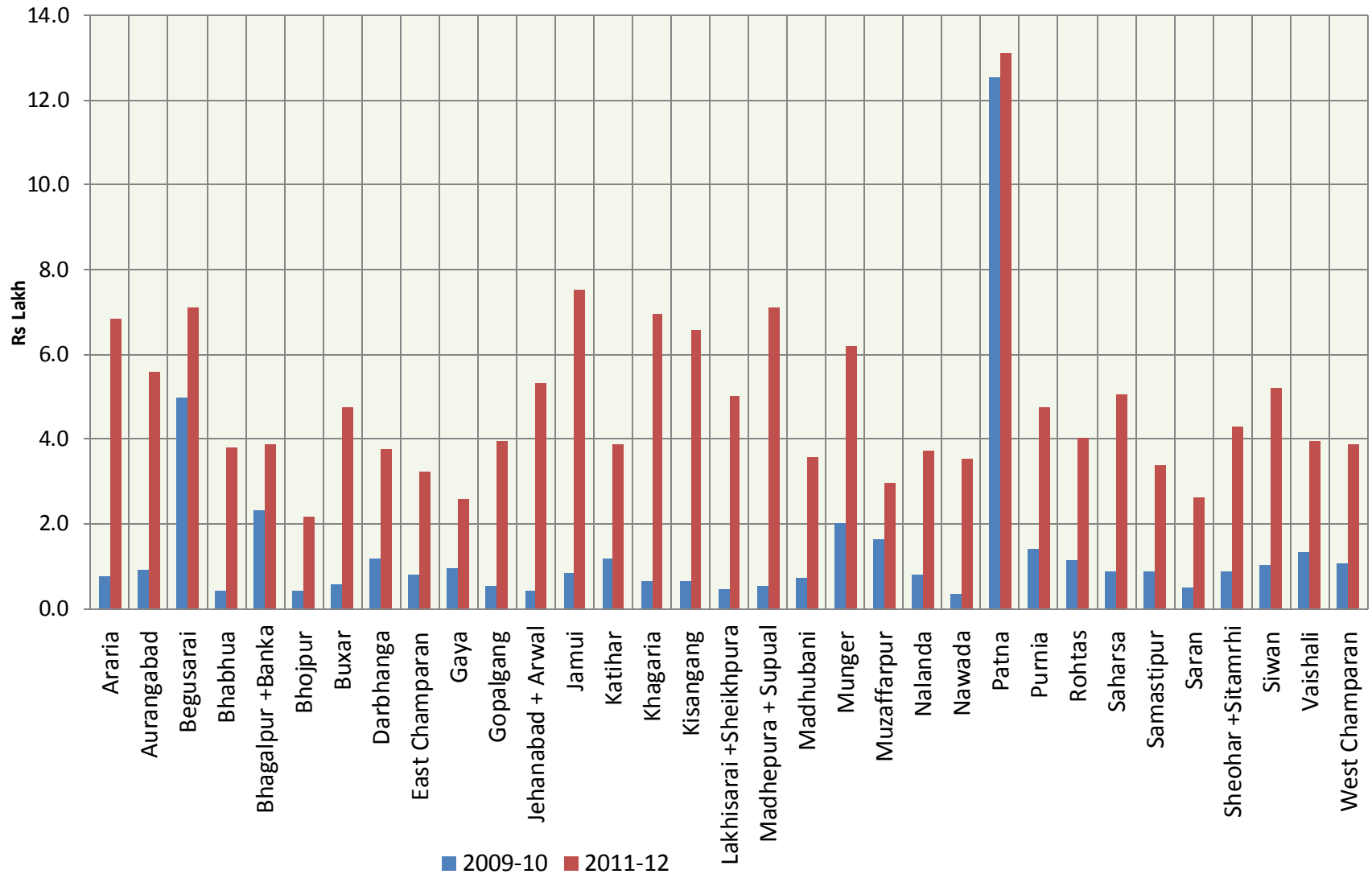
Limitations of Circle to District Mapping

For districts like Patna which consist of more than one circle, we cannot provide circle level computation of growth effects as GDP numbers are not generated at the sub-district level.

To do a robust exercise, a field based study within a district to measure variations in inter-circle sales of major commodities can be attempted.

However, for our purpose, district level computations are sufficient for indicative results.

Issues in setting commodity wise per dealer targets

- The sample targets confirm that the commodity spread is very uneven among districts/circles. One explanation is the lop-sided consumption base of Bihar's economy. However,

  - all commodities in the VAT schedule are not listed in the existing information system
  - there are gaps in data for existing commodities for various circles over the years
  - Dealers are tagged to a single commodity and hence a dealer handling more than one commodity cannot be captured in this dataset.

- Thus the existing reporting/information system needs modification before one can attempt a mapping of growth in commodity wise sales with fixation of per dealer tax targeting at the district/circle level.

Conclusion

- The results demonstrate that the 'growth effect' is limited in the overall structure of the tax base of Bihar but can correct the regional skew.
- The main criterion to set and achieve targets depends on the effort of the tax administration primarily at the district/circle with state level monitoring and corrective action.
- VAT target largely determines the overall collection in each circle. While this reinforces the rationale for VAT, it also indicates the need for greater effort for taxes other than VAT as is demonstrated by the relative weight of the VAT factor.
- Per dealer targets also confirm that consumption spread is very uneven among districts/circles. This is due to the lop-sided consumption base of Bihar's economy.
- Per commodity targets are prone to error due to the limitations of the existing information system. If this can be corrected, it can lead to robust target setting at the commodity and dealer level.
- The tax potential in the unorganised sector is lying untapped in the present tax net. This sector is absorbing a lot of the growth effect and yet remaining outside the tax net as is evident from work done by other organisations like IFC .

Thank you