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# Polity and Economy: A Study of the Coinage of the Western Kshatrapas

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**Abstract:** Present article is an attempt to understand the economic conditions during the reign of the Western Kshatrapas through their silver coins. A total of 168 coins of 14 different kings were taken into the consideration for the work and their silver content is discussed. Statistical analyses have been done to get quantitative support to the inferences drawn. The paper also investigates fineness of the coins of different Western Kshatrapa rulers, to understand political and economical stability of that particular ruler.

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**Keywords:** Polity, Economy, Coinage, Western Kshatrapas, Statistical Analysis, Graphical Representation, Standard Deviation

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## Introduction

The Western Kshatrapas, the Kshaharatas as well as the Kardamakas, ruled successively for more than 350 years, from about the beginning of the second half of 1st century CE to the beginning of the 5th century CE (Rajgor 1992: 87-105) over the region comprising modern states of Gujarat, Maharashtra and Madhya Pradesh. The Kardamakas issued coins with legends bearing the issuer's name and titles along with that of their fathers/predecessors. The early kings did not mention any dates on their coins. However, Rudrasimha I (or Damajadasri I, according to Fishman (2013: xiv)) initiated the practice of mentioning dates of the issuing of coins in continuous reckoning on them, which was continued by his successors. This phenomenon has no parallel in the history of coinage of ancient India.

Both the Western Kshatrapa families issued their coins primarily in silver. A number of rulers also issued coins of base metals such as copper, lead and also copper alloyed with arsenic. The most important Kshaharata ruler, Nahapana printed his bust encircled by Greek, Brahmi and Kharoshthi legends on the obverse side of his silver coins. On the reverse, he printed thunderbolt and arrow symbols which were his dynastic

symbols. The Kardamaka rulers usually had their busts encircled by a Greek legend in case of early kings and a decorative pattern in case of later kings on the obverse side and a three/six arched symbol with a wavy line under it flanked by solar and lunar symbols encircled within an elaborate Brahmi legend on the reverse. Of course details changed according to the ruler.

Scholars such as James Princep, Edward Thomas, E.J. Rapson, Bhagwanlal Indraji, G.V. Acharya, A.S. Altekar, P.L. Gupta, V.V. Mirashi, Ajay Mitra Shashtri, Dilip Rajgor, Amiteshwar Jha, Shailendra Bhandare, Pankaj Tandon (Shah 2012: 5-14), A.M. Fishman (2013) and many more have contributed immensely to the studies of the coinage of the Western Kshatrapas.

**Table 1: Chronology of the Western Kshatrapa Rulers (Fishman 2013)**

No	Name of the King	Dates
1	Nahapana	Second half of 1 <sup>st</sup> century AD
2	Chashtana	78 AD to 130 AD ?
3	Rudradaman I	Before 130 AD to 165 AD
4	Rudrasimha I	Kshatrapa – 165 to 177/178 AD and 188 AD to 190 AD Mahakshatrapa – 177/178 to 197 AD
5	Rudrasena I	Kshatrapa – 198 to 202 AD Mahakshatrapa – 190 ?199 to 222 AD
6	Damasena	Kshatrapa – 222 AD Mahakshatrapa – 222-238 AD
7	Vijayasena	Kshatrapa – 238 to 239 AD Mahakshatrapa – 239 to 251 AD
8	Rudrasena II	Mahakshatrapa – 255 to 276 AD
9	Bhartridaman	Kshatrapa – 276 to 282 AD Mahakshatrapa – 282 to 295 AD
10	Vishvasena	Kshatrapa – 292 to 304 AD Mahakshatrapa – 295 AD ?
11	Rudrasimha II	Kshatrapa – 304 to 316 AD
12	Yashodaman II	Kshatrapa – 315 to 332 AD
13	Rudrasena III	Mahakshatrapa – 348 to 378 AD
14	Rudrasimha III	Mahakshatrapa – 385 to 415 AD

In 1994, Amiteshwar Jha and Dilip Rajgor came out with their landmark publication, '*Studies in the Coinage of the Western Kshatrapas*'. In this book, they revised the history of the Western Kshatrapas with correcting the old hypothesis and adding new facts. A total of 1063 coin types and varieties were catalogued by them. They carried out metallic analysis of 223 coins. This work was very important because for the first time in the history of Indian Numismatics chemical analysis of so many coins was carried out. They analysed 223 coins in order to ascertain the chemical compositions of these coins with regards to metal content and subjected the same to further statistical analysis. This analysis was carried out to examine the silver content in the coins of

different kings. In the present article, an attempt has been made to use this data along with some new one to verify its bearing on the politico-economic history of the Western Ksatrapas, especially the Kardamakas.

For the present study, a total number of 41 silver coins from Dr. Dilip Rajgor collection, mainly those of the Kardamakas (see Table 1 for the chronology and Table 2 for the gravimetric analysis) were subjected to the gravimetric analysis to calculate the percentage of silver content in these coins. It may be noted here that though the methods used by Jha and Rajgor and the present authors are different, they do not lead to any discrepancy as far as the percentage of metal content is concerned.

Gravimetric Analysis determines the composition of a coin by applying the Archimedes principle. It can be determined by weighing the coin in air and then in a liquid of known specific gravity, usually water (Prakash and Singh 1968: 5). The details of the gravimetric Analysis have been given in Table 2.

**Table 2: Results of Gravimetric Analysis**

Serial No.	Name of the King	Date	Weight in air (gm)	Weight in water (gm)	Percentage of silver	Specific Gravity
1	Nahapana*	-	1.952	1.744	89.33	9.38
2	Chastana*	-	1.948	1.751	94.09	9.88
3	Rudradaman	-	1.831	1.600	75.42	7.92
4	Rudrasimha I	Un-dated	1.778	1.587	88.57	9.30
5	Rudrasimha I	100?	2.121	1.903	92.57	9.72
6	Rudrasimha I*	Date not visible	2.342	2.118	99.52	10.45
7	Rudrasimha I	103	2.065	1.852	92.28	9.69
8	Rudrasimha I	104	2.036	1.833	95.42	10.02
9	Rudrasimha I	107	2.061	1.842	89.61	9.41
10	Rudrasimha I	111	2.12	1.885	85.90	9.02
11	Rudrasimha I	114	2.296	2.056	91.04	9.56
12	Rudrasimha I	Date not visible	1.992	1.763	82.76	8.69
13	Jivadaman	1xx	1.893	1.689	88.28	9.27
14	Rudrasena I	126	2.282	2.059	97.42	10.23
15	Rudrasena I	134	2.359	2.105	88.38	9.28
16	Rudrasena I	136	2.037	1.822	90.19	9.47
17	Rudrasena I	140	2.281	2.042	90.85	9.54
18	Rudrasena I	142	2.274	2.044	94.09	9.88
19	Damasena	148	1.677	1.467	76.00	7.98
20	Damasena	154	2.198	1.967	90.57	9.51
21	Damasena	155	2.237	2.002	90.57	9.51
22	Damasena	155	2.195	1.958	88.19	9.26

23	Damasena*	157	2.394	2.160	97.42	10.23
24	Yashodaman I	Date not visible	1.944	1.746	93.42	9.81
25	Vijayasena	Date not visible	1.223	1.090	87.52	9.19
26	Rudrasena II	18x	2.323	2.089	94.47	9.92
27	Bhartridaman	210	2.465	2.207	90.95	9.55
28	Yashodaman II	Date not visible	2.118	1.902	93.33	9.80
29	Yashodaman II	2xx	1.946	1.749	94.00	9.87
30	Yashodaman II	2xx	2.327	2.067	85.23	8.95
31	Yashodaman II	23x	2.172	1.921	82.38	8.65
32	Yashodaman II	23x	2.371	2.129	93.23%	9.79
33	Yashodaman II	24x	1.874	1.663	84.57%	8.88
34	Rudrasena III	270	2.318	2.079	92.28%	9.69
35	Rudrasena III	273	2.209	1.979	91.42%	9.6
36	Rudrasena III	27x	2.241	2.005	90.38%	9.49
37	Rudrasena III	27x	2.277	2.04	91.42%	9.6
38	Rudrasena III	27x	1.927	1.72	88.57%	9.3
39	Rudrasena III	27x	2.069	1.832	83.04%	8.72
40	Rudrasimha III	3xx	2.163	1.939	91.90%	9.65
41	Indrada	Date not visible	2.219	1.988	91.42%	9.6

(\*See Figures 1-4 for images of these coins)



**Figure 1: Nahapana**

(Coin no 1; See Table 2)

**Obverse** - Bust of the king to right; inscription in Graeco-Roman characters, only a few letters have survived.

**Reverse** - Left, arrow pointing downwards; Right, thunderbolt and a pellet between the two and inscription is not visible properly.



**Figure 2: Chastana**

(Coin no 2; See Table 2)

**Obverse** - It's a double-stuck coin. Bust of the king is to the right. Traces of Kharoshthi legend are visible.

**Reverse** - Six-arched hill topped with a crescent; a wavy line below; left- sun and right-crescent; inscription in Brahmi

**Transliteration** - kṣatrapasa—ghsamotika-ghsakṣa.



**Figure 3: Rudrasimha I**  
(Coin no 6; See Table 2)

**Obverse** - Bust to right, corrupt Greek legend.

**Reverse** - Three-arched hill topped with a crescent; a wavy line below; left-crescent and right-sun; inscription in Brahmi.

**Transliteration** - Rājñomahākṣatra (pasa) Rudra (dāmna) putrasa Rājñomahākṣatrapasa Rudrasihasa



**Figure 4: Damasena**  
(Coin no 23; See Table 2)

**Obverse** - Bust to right, Date- 157

**Reverse** - Three-arched hill topped with a crescent; a wavy line below; left-crescent and right-sun; inscription in Brahmi.

**Transliteration** – Rājño Mahākṣatrapasa Ru---- putrasa RājñoMahākṣatrapasa Dāmasenasa

Following observations can be made from this analysis:

- Rudradaman’s coin (No. 3) shows silver content of 75.42% which is low compared to his other coins analysed by Jha and Rajgor (Table 2).
- All the nine coins of Rudrasimha I show low degree of variation.
- One coin of Rudrasimha I (No. 6) shows silver content of 99.52% which is the highest known so far.
- Coins of Rudrasena I display low degree of variation in the silver content.
- Damasena’s coin (Coin No. 19) shows 76% of silver content which is low compared to his other coins analysed by Jha and Rajgor (Table 3).
- Coins of Yashodaman II show low degree of variation in silver content.
- Coins of Rudrasena III coins show considerable degree of variation.

Table 3 shows the silver content as analysed by Jha and Rajgor (1994: 62-65)

**Table 3: Silver Content as Analysed by Jha and Rajgor (1994: 62-65)**

Name of the King	Percentage of Silver
Nahapana	90.01, 90.75, 91.01, 91.67, 93, 93.17, 93.26, 93.32, 93.44, 94.31, 94.54, 94.93
Nahapana (Counter struck)	95.53, 95.64, 96.21, 98.66, 98.74
Chashtana	90.75, 90.95, 92.3, 92.5, 92.6, 92.8, 94.3
Jayadaman	92.48
Rudradaman I	91.82, 91.86, 92.6, 92.98, 93.83, 94.63, 94.81
Damajadashri I	91.67, 95.08

Damaghsada	92.48
Rudrasimha I	70.84, 90.81, 90.82, 91.16, 91.62, 91.62, 91.84, 92.74
Jivadaman	92, 92.57
Satyadāman	93.57
Rudrasena I	89.54, 90.52, 90.98, 91.46, 91.69, 91.99, 92.27, 92.45
Prithivisena	90.86
Damasena	88.41, 90.42, 90.61, 91.28, 91.56, 92.12
Damajadashri II	90.68, 92.06
Viradaman	89.54, 89.83, 90.25, 90.74, 90.85
Vijayasena	38.78, 87.86, 88.96, 89.03, 89.72, 90.5, 90.51, 90.6, 90.71, 91.8, 92.1
Ishvaradatta	90.57, 90.87, 91.35, 92.65
Damajadashri III	42.08, 89.3, 89.7, 91.53, 92.13
Rudrasena II	86.71, 87.52, 87.6, 89.2, 89.52, 90.38, 90.64, 90.73, 91.86
Vishvasimha	82.6, 88.2, 90.26, 90.62
Bhartridaman	65.92, 80.06, 85.90, 86.30, 86.69, 86.9, 87.12, 87.20, 87.63, 89.82, 89.90
Vishvasena	69.03, 84.45, 85.12, 86.69, 90.16, 90.26, 92.68
Rudrasimha II	81.63, 86.01, 87.11, 87.28, 87.46, 89.45, 89.73
Yashodaman II	82.33, 82.86, 82.89, 83.73, 83.82, 87.17, 87.93, 87.96
Rudrasena III	37.95, 79.51, 82.33, 84.27, 84.72, 85.47, 87.86, 88.08, 89.18, 90, 90, 90.49, 90.76, 90.87, 91.74
Simhasena	78.06, 79.08, 82.45, 82.55
Rudrasena IV	79.31
Rudrasimha III	78.39, 78.76, 78.85, 79.01, 79.21, 88.06, 90.07, 90.67, 91.43

Besides these mentioned in Table 3 coin numbers 36, 63, 100, 116, 124, 132 and 170 given in Jha and Rajgor (1994: Table 1) have not been included because they were copper coins with silver impurity.

### Statistical Analysis

Data from both the above cited datasets was clubbed together. As stated above, silver content of the coins of 14 different kings (168 coins) (see Table 4) has been used for the present analysis. Care has been taken to make this analysis as representative as possible by incorporating a long time span ranging from Nahapana to Rudrasimha III. In addition, only those kings with sizable data have been chosen.

A two-fold analysis was carried out on this data. The first part involved some basic statistical analyses such as calculation of mean values and standard deviation (Figure 5). Following steps were taken to conduct the basic statistical analysis:

- Chosen data was arranged in a tabular format
- Coins of one single king were clubbed together
- Mean values of silver content were calculated
- Their standard deviation values were also calculated
- Maximum and minimum ranges of standard deviation were calculated
- These figures were plotted on graph.

**Table 4: Basic Statistical Analysis**

<b>Name of the King</b>	<b>n</b>	<b>Min-Max</b>	<b>Median</b>	<b>Mean</b>	<b>SD</b>	<b>COV%</b>
Nahapana	18	89.33-98.74	93.38	93.75	2.65	2.83
Chashtana	8	90.75-94.3	92.55	92.54	1.27	1.37
Rudradaman I	8	75.42-94.81	92.79	90.99	6.39	7.02
Rudrasimha I	17	70.84-99.52	91.16	89.95	6.07	6.75
Rudrasena I	13	88.38-97.42	91.46	91.68	2.23	2.43
Damasena	11	76.00-97.42	90.57	89.74	5.15	5.74
Vijayasena	12	38.78-91.8	90.11	85.67	14.83	17.31
Rudrasena II	10	86.71-94.47	89.95	89.88	2.28	2.54
Bhartridaman	12	65.92-90.95	87.01	85.37	6.7	7.85
Vishvasena	7	69.03-92.68	86.69	85.48	7.85	9.18
Rudrasimha II	7	81.63-89.73	87.28	86.95	2.69	3.09
Yashodaman II	14	82.33-94.00	84.9	86.53	4.23	4.89
Rudrasena III	21	37.95-92.28	89.18	85.73	11.51	13.43
Rudrasimha III	10	78.39-91.9	83.635	84.64	6.18	7.30

In the second step of analysis, the observed silver content in coins belonging to different kings has been further analysed by using One-Way Analysis of Variance (or one-way ANOVA). This is a technique that can be used to compare means of three or more samples. This technique is helpful in knowing whether samples in three or more groups are similar to each other (null hypothesis) or there is a variance among samples. This test has been performed to know whether the silver content on coins was significantly different during different kings or not. This particular method was adopted to compare variation in silver proportions a) between the kings and b) within one single king (Maxwell 1972: 103).

The statistical output of this test can be simply expressed in the form of Table 5. This table indicates whether we have a statistically significant difference between kings or not. We can reject the null hypothesis if  $p\text{-value} \leq 0.05$  and we can assume that we do not have enough evidence to reject the null hypothesis if  $p\text{-Value} > 0.05$ . The results from the above table show that the  $p\text{-value}$  is 0.0134, which is less than the significance level of 0.05. Hence, there was a statistically significant difference between different kings as determined by one-way ANOVA ( $F_{13,145} = 2.171$ ,  $p = .0134$ ), which is below 0.05. Therefore, the silver% under different kings is significantly different from each other.

Analysis of variance also throws light on the fact that the variation between kings was more than within individual kings.

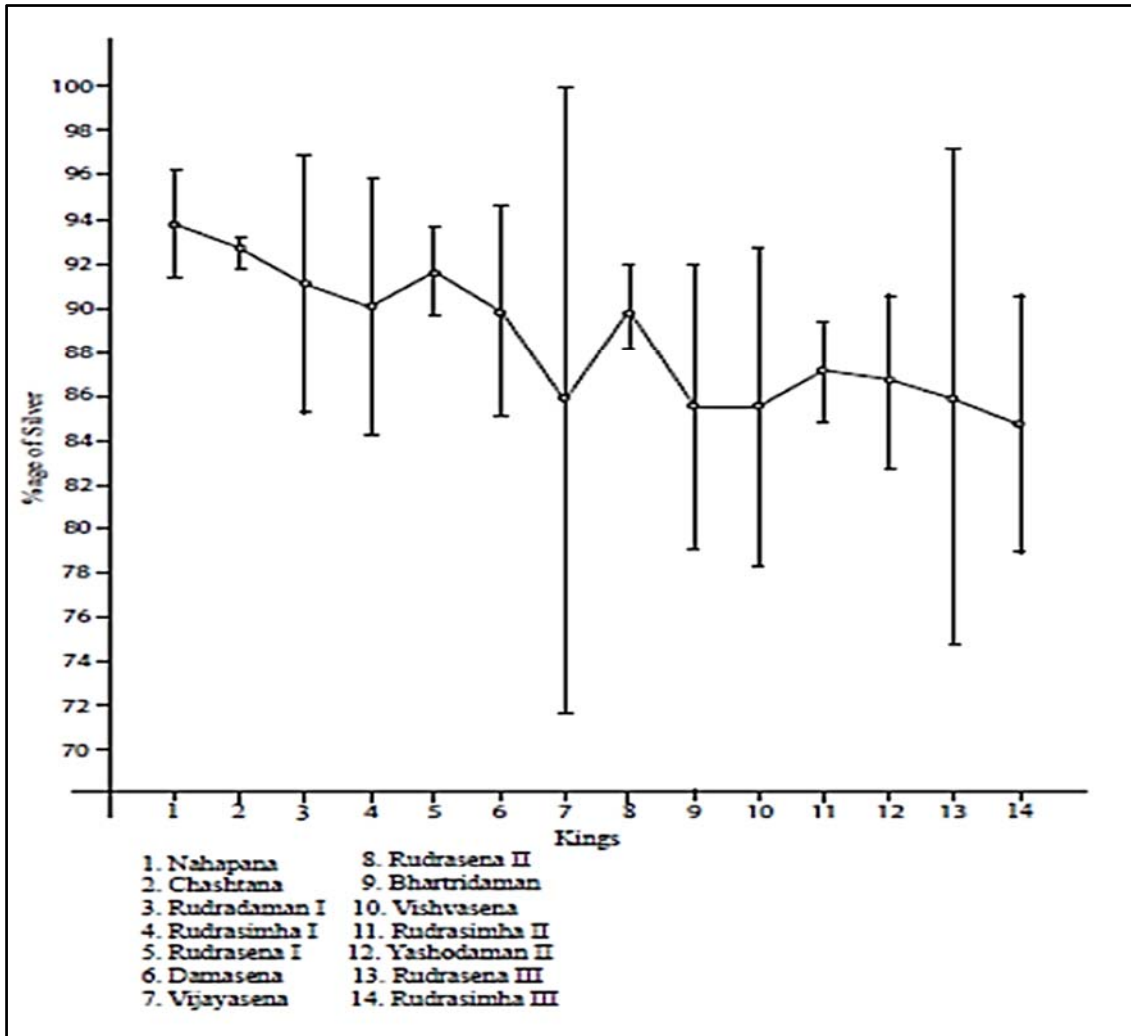


Figure 5: Graphical Representation of Mean Values and Standard Deviations

Table 5: Results of One-way ANOVA

	Degree of freedom	Sum of Squares	Mean Square	F Value	P
Between the Kings	13	1503	115.67	2.17	0.0134
Within Groups	145	7724	53.27	-	-
Total	158	9227	-	-	-

Following inferences are drawn with the help of the above Statistical analyses:

- A gradual decline of silver content can be seen from king 1 to 4 (Nahapana to Rudrasimha I)
- A considerable increase can be seen in the period of Rudrasena I
- A significant drop in silver content can be observed in the period of Vijayasena.



- A sudden increase in silver content in the period of Rudrasena II
- A gradual decrease in silver content can be seen in the period of Bhartidaman
- It remains steady till the last king Rudrasimha III
- King Nos. 2, 5, 8 and 10 have low degree of variations within themselves.
- On the other hand 3, 4, 9, 10, 14 show a good amount of variation.
- However, coins of Vijayasena and Rudrasena III show a great amount of variation.
- Analysis of Variance revealed that the variation between kings was more than variation within individual kings since the calculated F-ratio (2.17) is larger than F-ratio table value at 1% level of significance.

## Discussion

An old Jaina Gatha found in a commentary of the Avashyaka Sutra states that Nahavana (Nahapana) had amassed wealth and was staying at Bharukaccha, his capital (Shrava 1947: 62). *Periplus of the Erythraen Sea* states that around 1st century CE there was flourishing maritime trade from the ports of Barygaza (Bharuch), Kalliena (Kalyan) and Sopara. The Indians carried on flourishing trade with foreign countries like Egypt, Greece, and Italy (Schoff 2010). Texts preserved in the literature state that economic condition during the Kshatrapa period was good.

The Western Kshatrapas who existed for more than 350 years circulated silver, copper and lead coins in their region. These coins enjoyed a very wide popularity in commercial circles and have been found far away from the Kshatrapa dominion. Isolated hoards of these coins, as found in Andhra Pradesh and Karnataka, may not prove anything politically, but it has some bearing on the economic condition, namely traders' movements from place to place (Mangalam 1983: 45). Issuing coins in silver for more than 3 centuries shows their prosperity.

With the help of data generated by Jha and Rajgor (1994), it was easy to understand the economic position of the Kshatrapas at the micro level. In order to generate more data and to show a clear picture, analyses of 50 coins were carried out. An attempt has been made to show more clear vision. With the help of these analyses, king-wise economic history of the Kshatrapa period can be reconstructed.

Nahapana's regime seems to be economically stable during his reign. The silver content in his coins is more or less constant. This could be because of the thriving Indo-Roman trade. Probably because of this high silver content his coins continued to be in circulation in spite of being counterstruck by Gautamiputra Satakarni. In other words, Gautamiputra allowed these coins to be in circulation because of their high silver content, thus reaping the rich benefits of the Indo-Roman trade. Statistical analysis shows that when Chastana came to the throne, there was a minute dip in the silver content, though he maintains a good amount of consistency in issuing silver coins.

Rudradaman's rule also seems to be stable economically. That he was an able strong ruler is already apparent from his Junagarh inscription. However, his one coin

analysed in the present study shows silver content of 75.42%, which is significantly low. Interestingly, this particular coin (No.3) has an incorrect legend too. Analysis shows that the mean average of silver content in his coins has noteworthy variations. This leads one to conclude that the percentage of silver was adjusted by the king whenever necessary. At the same time care was taken to maintain the average silver content always around 91% (90.99% as revealed by this study).

Similar thing is observed in the case of the Rudrasimha I. One of his coins, in the present study shows fineness of 99.52%. It seems that he enjoyed a good economic position during his rule. However, much cannot be inferred on this single coin as the data is limited.

During the reign of Rudrasena I, the mean average of silver content is raised and it shows no big variation. Looking through all the observations, it can be inferred that though silver content took a downward slope from Nahapana to Rudrasimha I, Rudrasena I pulled the silver content and was probably able to maintain it with good economic policies.

However, after the rule of Rudrasena I, from Damasenaup to Vijayasena there is a significant drop in metal content. The rule of Vijayasena shows a great Variation as far as silver content is concerned. This variation was probably due to some desperate measures taken by the king in bringing the economy back on track. Damasena enjoyed a long rule. However, after him, within a span of four years there were three Kshatrapas (Damajadashri II (154-155), Viradaman (156-160) and Yashodaman I (160)); and two Mahakshatrapas (Sanghadaman (149) and Yashodaman I (160-162)). Hence, it can be inferred that there was some political disturbance in this period. Vijayasena, after coming to power must have had to face some trouble and must have taken some time to stabilise his rule. This disturbance was probably because of the 'Abhira' king Ishvaradatta (Indraji 1890). Jha and Rajgor (1994) also believe that Ishvaradatta may have conquered some territory of Vijayasena. This conquest, however, seems to be temporary as Ishvaradatta's coins have only two years of his regime mentioned on them. Vijayasena was probably successful in getting back his territory. This upheaval is reflected in the variation in the silver content of his coins. He was able to maintain the average silver content at around 86% (85.67%).

Rudrasena II ruled for a long duration (177-200) without any opposition. There was no Kshatrapa during his reign except for Vishwasimha (199-202) and Bhartridaman (200-204), his own sons, who ruled as a Kshatrapas only during the fag end of Rudrasena's rule. His coins too depict the same story as he was able to maintain the high silver content (89.88%) without much variation.

Coins of Bhartridaman, Rudrasena's son and successor as the Mahakshatrapa, show a major change in their silver content. It reduces to 85.37%. This trend remains more or less constant with later kings. Although, all these kings from Bhartridaman onwards ruled for long durations, they were not able to raise the fineness of their coins. It may

be pointed out here that After Bhartridaman, whose last known year of rule was 217 Saka Era, there was no Mahakshatrapa for almost 53 year till Rudrasena III. Kings such as Vishvasena (205-225), Rudrasimha II (226-236) and Yashodaman II (239-254) could rule only as the Kshatrapa and not as Mahakshatrapa as revealed from their coins discovered so far. This again suggests some political disturbance. Rudrasena III ruled for 30 years (270-300). His coins show significant variation in the silver content. One of his undated coins, analysed by Jha and Rajgor (1994: 64) shows only 37.95% silver. However, this study shows that he was able to maintain the mean silver content to about 85.73%. It is interesting to note that similar phenomenon was observed in the coinage of Vijayasena. This is a very good example of strong polity controlling a shaky situation and bringing it under its control.

Last rulers of this dynasty, Rudrasimha III and Indrada were somehow able to maintain the economic as well as political stability as revealed by their high silver content. However, Indrada seems to be a weak ruler and after him this dynasty lost its prominence.

Generally speaking, it can be seen that whenever the silver content was taking a downward slope the kings were able to stabilize themselves and were able to raise the metal content wherever necessary.

Another point to notice is that the variation between kings is more than variation within each king. Thus it can be inferred that whenever the king came to the throne he was able to stabilise himself and whenever his economic position took a downward slope the next king tried to better the condition which can be inferred by the variation in the silver content of their coins.

A coin of Rudrasena III was found in a pot in the excavations at the Berenike church from the Red sea coast. This pot contained 7.5 kg of Black pepper (Tomber 2008: 76). This evidence testifies trade contacts between India and the Red Sea coast even in later times during the reign of Rudrasena III. A study of material remains by Margbandhu revealed that India was passing through a phase of economic growth. The export of a number of agricultural products to the western world may also have given impetus to increased cultivation. There was a rapid growth of urban life which marks the development of socio-economic life of India during this period. The technological progress giving impetus to urbanisation has been fairly well reflected in material culture of the times (Margbandhu 1958: 357).

The Kshatrapas had a strategic geographical area of Indus Delta, coastal Gujarat and northern Konkan under them along with a hinterland with many big urban centres under them. This enabled them to carry out extensive trade within their territory as well as with foreign countries. They were good economists and administrators in their own sense. The rule of the Western Kshatrapa was a long one of almost 300 years. Although the dynasty came to an end, its coinage left an indelible influence on all the later silver coinages.

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